Obsessive Compulsive Behaviors in Children with Developmental Disabilities: A Function-based Conceptual Framework and Single-case Application

Emily Guertin, BSc

Department of Applied Disability Studies

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Faculty of Social Sciences, Brock University

St. Catharines, Ontario

Abstract

Repetitive behaviors are prevalent in a number of neurodevelopmental disorders including autism spectrum disorder (ASD) and intellectual disability (ID). A subset of repetitive behaviors found in ASD and ID can be topographically similar to symptoms in obsessive compulsive disorder (OCD). Through two manuscripts in preparation (Chapters 2 and 4), this project aims to discuss a function-based approach to conceptualizing, assessing, and treating obsessive compulsive behaviors (OCBs) in ASD and ID.

The first manuscript is a conceptual paper responding to the variety of approaches researchers use to categorize the behaviors (i.e., assigning a comorbid diagnosis or acknowledging overlapping symptoms of ASD). To date, a clear consensus has not yet been reached amongst the researchers in this field. This paper builds on the differential diagnosis guidelines of the *DSM-5* and clinical experts in the field by providing a multidisciplinary, function-based approach to conceptualizing, assessing, and treating individual OCBs in ASD using clinical case examples. Obsessive compulsive behaviors can serve a variety of functions beyond the reduction of anxiety including automatic positive reinforcement or socially mediated reinforcement. The strengths of function-based treatment combined with cognitive behavioral therapy for working with complex obsessive compulsive behaviors in ASD are presented.

A second manuscript demonstrates the applicability of this framework in a single case study of four-year-old boy with mild ID and obsessive compulsive behaviors. An intensive, adapted version of function-based cognitive behavioral therapy was administered in the boy's preschool. The treatment successfully eliminated two OCBs while concomitantly teaching joint engagement with peers on work-related tasks. Results were maintained at a three-week follow-up. The implications of the treatment protocol, in addition to the broader importance of working

from a multidisciplinary perspective for children with obsessive compulsive behaviors, are discussed.

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Chapter 1: General Introduction

Repetitive behaviors are common in children with developmental disabilities, including autism spectrum disorder (ASD) and intellectual disability (ID; Lam, Bodfish, & Piven, 2008; Moss, Oliver, Arron, Burridge, & Berg, 2009). A number of topographies of repetitive behavior found in these populations overlap with symptoms characteristic of obsessive compulsive disorder (OCD), for example the need for sameness (e.g., sitting in the same seat), rituals (e.g., bedtime routines), or compulsive behaviors (e.g., checking or arranging). Due to the acknowledged difficulty in assessing these behaviors and a lack of consensus on the clinical approach to classification (Paula-Pérez, 2013; Scahill & Challa, 2016; Wu et al., 2014), some researchers have referred to this subgroup of repetitive behaviors as obsessive compulsive behaviors (OCBs; Chok & Harper, 2016; Vause et al., 2015). The focus of this thesis is to investigate the unique challenge posed when assessing and treating OCBs in children with development disabilities from a functional behavior-based perspective.

First, a conceptual chapter reviews the existing approaches in the literature to assessing and diagnosing obsessive compulsive behaviors in autism spectrum disorder (ASD; Chapter 2). This paper builds on the guidelines provided by the *DSM-5* (American Psychiatric Association [APA], 2013) and clinical experts in the field by describing how to conceptualize obsessive compulsive behaviors within a function-based framework rather than focusing on topography alone. It provides case examples to highlight the variety of and combination of functions responsible for maintaining these behaviors. Treatment components effective at reducing the behaviors are summarized for each of the reviewed functions. Research and recommendations are reviewed for incorporating functional assessments for children with ASD within a cognitive behavioral therapy (CBT) treatment context when other behavior analytic technologies such as

functional analyses may not be feasible. Strengths, limitations, and future directions of this function-based treatment are discussed. This paper is planned for submission as a standalone paper for publication in the fall of 2017.

The conceptual paper sets a theoretical foundation for the rationale and utility and of a functional behavior-based CBT treatment package (Vause et al., 2015). The treatment package, originally designed for school-age children with ASD, was adapted for a young boy with mild intellectual disability and obsessive compulsive behaviors. In Chapter 3, an extended literature review provides a comprehensive summary of the relevant literature informing the case study, including the prevalence, interference, and treatment of OCBs in children with developmental disabilities using ABA, CBT, and a combination of the two treatment modalities. Next, Chapter 4 includes a manuscript in preparation for publication to *Behavioral Interventions*. The case study used a single-subject, multiple baseline across behaviors design to evaluate the effectiveness of the adapted Fb-CBT treatment package for a four-year-old boy with intellectual disability. The study aimed to reduce a disruptive daily morning entry routine to his school and the insistence on completion of work tasks without the presence or interaction with peers while also increasing the boy's social engagement skills during work tasks. Adaptations to the treatment included the removal of psychoeducation and cognitive strategies that were dependent on complex language (e.g., cognitive restructuring) and a heavier emphasis on antecedent and behavioral strategies (e.g., replacement behaviors, differential reinforcement, and exposure and response prevention).

Finally, Chapter 5 provides a general discussion of the conceptual and applied studies. Broader implications for the use of a multimodal approach combining CBT and ABA components to develop a robust and function-specific treatment package will be discussed.

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Delving Deeper into the Puzzle of Overlapping Symptoms in Obsessive Compulsive and Autism Spectrum Disorders

Chapter 2: Delving Deeper into the Puzzle of Overlapping Symptoms in Obsessive Compulsive and Autism Spectrum Disorders: A Behavior Analytic Conceptual Framework

Abstract

There is a lack of consensus in the literature on whether repetitive behaviors resembling symptoms of obsessive compulsive disorder (OCD) in autism spectrum disorder (ASD) represent a comorbid diagnosis of OCD or are overlapping symptoms subsumed under ASD. Clinical experts in the field who assign comorbid OCD diagnoses have attempted to offer some guidelines for differential diagnosis; an important consideration of these guidelines is assessing the underlying cause of the repetitive behavior. Building on these guidelines, this paper discusses the often complex role that the function of a repetitive behavior serves for the individual. The repetitive behaviors may reduce anxiety, provide enjoyment, and/or provide secondary gains to the individual. Case examples will be used to illustrate the influence of function on the ongoing presentation of repetitive behaviors in ASD. A review of the methods used to assess function for these repetitive behaviors is provided with recommendations for incorporating functional behavioral assessments in the psychosocial treatment setting. Limitations and future directions for function-based treatment of these repetitive behaviors are discussed.

Introduction

Obsessive compulsive disorder (OCD) is characterized by the presence of obsessions, compulsions, or both that are time consuming and interfere significantly with daily activities of the individual (*DSM-5,* American Psychiatric Association [APA], 2013). Obsessions are recurrent and persistent thoughts, urges, or images (e.g., fears of contamination or imminent harm) that are intrusive and unwanted, often causing anxiety or distress for the individual. Compulsions are repetitive behaviors or mental acts (e.g., ordering, checking, or counting) that

are performed in order to reduce the distress associated with obsessions or fit a rigid set of rules. The lifetime prevalence of OCD by the end of adolescence is 2 to 3% (Zohar, 1999). Given the limited ability of children to articulate obsessions for compulsions, the presence of obsessions is not required in the diagnosis of pediatric OCD (APA, 2013). Research in the past two decades has established Cognitive Behavioral Therapy (CBT) as the treatment of choice. A recent meta-analysis of treatments for pediatric OCD show a large effect size (d = 1.203) for reduction in OCD symptoms following CBT (Sánchez-Meca, Rosa-Alcázar, Iniesta-Sepúlveda, & Rosa-Alcázar, 2014). Treatments consist of psychoeducation, mapping symptoms, cognitive and behavioral strategies, and exposure and response prevention (ERP), whereby the individual is exposed to the stimuli associated with the compulsion and is prevented from engaging in it. The prevailing view is that during ERP, participants habituate to the anxiety created by the obsessional triggers, resulting in decreased levels of anxiety in the presence of those cues (March & Mulle, 1998).

Autism Spectrum Disorder (ASD) is a neurodevelopmental disorder that is characterized in part by the presence of interfering repetitive behaviors. The key domains of ASD include difficulties in social communication or interaction, and restricted or repetitive behaviors (RRBs) with an onset of symptoms during the developmental period (*DSM-5,* APA, 2013). The interference of RRB symptoms in daily functioning is a predominant consideration for determining the severity of ASD. Factor analysis research on RRB presentation in children with ASD reveals at least two categories: lower-order and higher-order RRBs (Mirenda et al, 2010). Lower-order RRBs include behaviors such as motor and verbal stereotypy or echolalia; higher-order RRBs include behaviors such as insistence on sameness (e.g., items remaining in the same location, or using particular items or doors), compulsions (e.g., cleaning or arranging), or

ritualistic behaviors (e.g., rigid bedtime or self-care routines). In a study of 316 individuals with ASD (mean age: 9.02 years), items on the Autism Diagnostic Interview-Revised (Lord, Rutter, & Le Couteur, 1994) representing a need for sameness and compulsions/rituals were reported in 24% to 56.6% of the sample (Lam, Bodfish, & Piven, 2008). The variability in prevalence reflects the variation in the category of behaviors evaluated. The onset of higher-order RRBs appears later than lower-order RRBs and shows a unique behavioral trajectory increasing in severity from two years of age to a stable level at five years of age (Richler, Huerta, Bishop, & Lord, 2010). The interference of higher-order RRBs with developmental opportunities (e.g., social or educational) is thought to lead to negative developmental outcomes for the individual later in life (Boyd et al., 2012). While higher-order RRBs are acknowledged to be a prevalent and interfering symptom of ASD, only limited research in the form of preliminary randomized controlled trials (e.g., Vause, Neil, Jaksic, Jackiewicz, & Feldman, 2015) and several case studies (e.g., Boyd, McDonough, & Bodfish, 2013; Chok & Harper, 2016; Chok & Koesler, 2014; Kuhn et al., 2009; Rodriguez et al., 2012; Vause, Hoekstra, & Feldman, 2014) have sought to treat these behaviors.

Overlapping Symptom Presentation in ASD and OCD

Diagnostic Criteria

Notably, compulsions in OCD and higher-order RRBs can show overlapping patterns of symptom presentation. The *DSM-5* (APA, 2013) does not provide differential or comorbid diagnosis guidelines for ASD and OCD, but does note when criteria for both ASD and another diagnosis are met, that a comorbid diagnosis should be provided. In OCD diagnostic criteria, the *DSM-5* states a requirement of diagnosis is that "the disturbance is not better explained by the symptoms of another mental disorder (e.g., … repetitive patterns of behavior, as in autism

spectrum disorder)" (APA, 2013, p. 237). The *DSM-5* therefore permits comorbid diagnoses of ASD and OCD provided the obsessions or compulsions observed in an individual extend beyond the symptoms explained by an ASD diagnosis. It is not clear based on these descriptions, however, what behaviors are subsumed within the ASD diagnosis. Differential reasons for why the individual performs the behavior may help to distinguish these disorders.

Standardized assessments. Standardized assessments for OCD offer more specific guidelines for providing an OCD diagnosis in typically developing populations. The Children's Yale-Brown Obsessive Compulsive Scale (CY-BOCS; Goodman, Scahill, Price, Rasmussen, Riddle, and Rapoport, 1986) is a semi-structured interview assessing the presence, severity, resistance, interference, and distress associated with obsessions and compulsions. The CY-BOCS shows good psychometric properties for typically developing populations (Storch et al., 2004). After selecting target obsessions and compulsions, ratings are collected on the duration of the behaviors, intervals of time without the symptoms, interference with daily living, distress associated with symptoms, and the patient's ability to resist the symptoms, on a scale from zero (i.e., "none") to 4 (i.e., "extreme"). By combining scales of obsessions and compulsions, a clinical cut-off score of 10 or less has been established by researchers in the field (Pediatric OCD Treatment Study, 2004; Storch et al., 2013); the total score also determines the diagnosis and severity of pediatric OCD (Goodman et al., 1986). In one study with a limited sample of persons with ASD (n = 46), aged 7 to 15 years, the CY-BOCS shows only satisfactory overall psychometric properties, with the Obsession and Compulsion Severity subscales showing good (α = .82) and poor (α = .59) internal consistency, respectively (Wu et al., 2014a). The authors hypothesized the poor internal consistency for the Compulsion Severity subscale could be in part to the measurement of multiple functions within the same scale (i.e., ego-syntonic and ego-

dystonic behaviors). In addition, a clinical cut-off establishing comorbid diagnostic criteria has not been explicitly established for this population, accounting for the possibility of symptom overlap increasing the overall total score in the measure for persons with ASD. Several years ago, a version of the CY-BOCS was created for children with Pervasive Developmental Disorder (CY-BOCS-PDD; Scahill et al., 2006), but this scale includes items measuring measures of lower-order RRBs (e.g. stereotypy or echolalia) and does not include a subscale for obsessions. This measure therefore provides a measure of repetitive behaviors in ASD that does not fit with the classic symptoms of OCD.

Another standardized diagnostic measure is the Anxiety Disorders Interview Schedule for *DSM-IV* (ADIS-IV; Silverman & Albano, 2004). The ADIS-IV is a semi-structured interview that provides a comprehensive diagnostic assessment of anxiety disorders, externalizing disorders, and screening for other childhood disorders (e.g., learning disability) based on *DSM-IV* (APA, 1994) criteria. The instrument has good to excellent test-retest reliability (Silverman, Saavedra, & Pina, 2001). The ADIS-IV (OCD module) requires individuals to have obsessions, compulsions, or both for more than an hour a day that are causing distress, occurring for an hour or more, or interfering in the individual's daily functioning. Similar to the majority of research on psychometric properties of the CY-BOCS, the criteria for an OCD diagnosis are also based on a typically developing population; there are no specific, established criteria provided for diagnosing OCD in children with ASD. Due to the limitations in these measures for providing comorbid diagnoses in ASD populations, measures designed specifically for ASD are required to provide an accurate description of existing compulsions and related symptoms.

Diagnostic approaches in the literature. Despite the limitations of diagnostic assessments, researchers are presently assigning or describing comorbid diagnoses of OCD in

children with ASD. In two randomized, controlled trials of CBT for children with ASD and comorbid anxiety disorders, researchers described a few participants with comorbid diagnoses of OCD based on the ADIS-IV – parent report (Silverman & Albano, 1996) and semi-structured interviews (Storch et al., 2013; Wood et al., 2009). An open trial of CBT for pediatric OCD reported nine participants had existing comorbid diagnoses of OCD and pervasive developmental disorders (Farrell, Waters, Milliner, & Ollendick, 2012). Finally, in a quasi-experimental study comparing the effectiveness of CBT for adolescents with OCD and ASD to typically developing children, researchers used a combination of clinical interviews and the CY-BOCS to assign comorbid diagnoses of OCD (Murray, Jassi, Mataix-Cols, Barrow, & Krebs, 2015). Assigning comorbid OCD diagnoses to children with ASD is therefore a common approach in treatment studies. Given the limited attention and guidelines provided for the psychometric properties and diagnostic instruments for this population, and the limited social-communication skills of children with ASD, these challenges may lead to more inconsistency in the clinical interpretation of the topographically overlapping symptoms of the two disorders.

In light of the acknowledged difficulty with parsing out symptoms of the two disorders, researchers discuss the complications arising from assigning comorbid diagnoses including the false positive or negative comorbid diagnoses of OCD in ASD (Paula-Pérez, 2013). Some offer an interpretation of the overlapping symptoms in ASD as parallel symptoms but differentially expressed through the two disorders (Cath, Smit, & Comjis, 2008; Ivarrsson & Melin, 2008; Ruzzano, Borsboom, & Geurts, 2015). One explanation is the underlying cognitive deficits in ASD may increase the individual's propensity for a broad spectrum of repetitive behaviors including those similar to OCD symptoms (Wood & Gadow, 2010). The approach of some researchers has therefore been to categorize overlapping symptoms as obsessive compulsive

behaviors (OCBs) or similar terms, acknowledging the overlapping symptomology while refraining from providing a comorbid diagnosis (Vause et al., 2015; Chok & Koesler, 2016).

Expert clinical guidelines. As a result of the ongoing discrepancies in the approach to categorization and assessment, clinical experts have attempted to provide guidelines for differentiating symptoms of the two disorders. The guidelines suggest that obsessions are not often reported in children with ASD; this could be due in part to the limited ability for children and youth with or without ASD to articulate the motivation for a behavior (Scahill & Challa, 2016). Obsessions are described as occurring pervasively throughout the day for OCD whereas symptoms may only occur when rigid rules are not followed in ASD (Wu et al., 2014b). It is important to note, however, that obsessions are not a required feature of OCD for children according to the *DSM-5* (APA, 2013), further complicating this distinction. It is discussed that people with OCD follow rigid rules as a result of fearing the outcome (e.g., moral repercussions) but people with ASD are more likely to follow rigid rules due to an underlying inflexibility and need adherence to rules (e.g., 'This is the route I take to school'; Wu et al., 2014). Indeed, research in overlapping OCD and ASD symptoms shows a weaker link between thoughts or obsessions and repetitive behaviors in OCD (Ruzzano et al., 2015). Further complicating this distinction is the subtype of OCD in which a person engages in compulsive behaviors until it feels "just right", which overlaps with the conceptualization of behavioral inflexibility or rigid rule following in ASD more closely (Wu et al., 2014b).

Some researchers suggest one of the key distinguishing factors between topographically similar behaviors is that compulsions provide relief from the images, urges, or distress of obsessions whereas higher-order RRBs in ASD provide enjoyment to the individual (i.e., ego-dystonic and ego-syntonic functions, respectively; Scahill & Challa, 2016; Wu et al., 2014b). In

addition to the repetitive behavior serving these functions, researchers acknowledge that OCBs can serve other operant functions or secondary gains (e.g., providing the individual with attention, access to items, or removal of aversive situations; Scahill & Challa, 2016; Wu et al., 2014b). They acknowledge the importance of assessing the environmental variables surrounding the behaviors to gain further information into whether or not repetitive behaviors are indicative of OCD or ASD cases. While the majority of studies assessing functions of OCBs suggest a dichotomy of either ego-syntonic or dystonic function (Wu et al., 2014b; Chok & Koesler, 2016; Rodriguez et al., 2012), some studies have found socially mediated functions (e.g., accessing attention) or combinations of multiple functions influencing the ongoing presentation of OCBs (Vause et al., 2014; 2015).

Purpose

This paper will build on the guidelines by clinical experts aimed at differentiating behaviors typical of of OCD and ASD (Scahill & Challa, 2016; Wu et al., 2014b) by providing an operant learning framework of understanding obsessive compulsive behaviors. Operant functions (e.g., automatic positive or negative reinforcement, attention, or escape from tasks) can play an important role in the ongoing presentation of behaviors typical of both ASD and OCD and provide a helpful framework for understanding these behaviors (Ivarrson & Melin, 2008). Using examples based on clinical cases from treatment studies approved by a University Research Ethics Board (Vause et al., 2014; 2015), this paper describes each of the possible operant mechanisms and combinations thereof that may be maintaining OCBs based on models proposed by Miltenberger (2005). Recommendations based on the literature on functional behavioral assessment of OCBs are presented. This framework uses functional behavioral assessment as the primary guide for selection of treatment components. The treatment options

provide clinicians the ability to treat a variety of behaviors on a spectrum of functions from behaviors serving functions similar to OCD (i.e., anxiety relief, referred to behaviorally as automatic negative reinforcement) to ASD (e.g., automatic positive or socially mediated functions), or combinations of these functions.

Underlying Causes of Obsessive Compulsive Behaviors

Behavior analysis relies on understanding the environmental conditions that lead to an individual performing and continuing to perform a behavior. Given the acknowledged importance in assessing the underlying reason(s) for an individual with ASD engaging in a repetitive behavior for differential diagnosis of OCD, function-based assessments provide important information to the clinician. In operant learning, the consequence or event following a behavior can reinforce the behavior. The items, people, or events present in the environment immediately preceding the individual performing the behavior (i.e., discriminative stimuli) can come to serve as indicators that the behavior will be reinforced if performed. Over time, the individual learns to discriminate between the environments in which the behavior will be reinforced or not; the individual then performs the behavior primarily in the contexts in which the behavior will be reinforced.

The learner's likelihood of performing the behavior also depends on the present value of the reinforcer. Certain events (i.e., setting events) can occur to either increase or decrease the probability and value of obtaining a consequence (Cooper, Heron, & Heward, 2007). An increase in value for a reinforcer that results in an increased probability of performing a behavior to get that reinforcer is called an establishing operation. For example, if a mother has diverted attention from her child for a period of time, the value of attention will increase and the child will have an increased probability for engaging in behaviors that resulted in receiving her attention (e.g.,

asking her a question or crying). By considering the relationship between setting events, establishing operations, and contingencies, the clinician can get a clearer picture of the cause of the behavior.

By assessing the underlying causes of behaviors, treatment can be targeted to the idiosyncratic motivating and contingency variables for the client. Incorporating procedures shown to be effective for each of the maintaining contingencies allows clinicians to more effectively reduce the behavior (Chok & Koesler, 2014). In complex cases when behaviors are maintained by multiple causes, the integration of CBT techniques with function-based ABA strategies may be necessary to effectively reduce the behavior. If a function is not addressed, treatment progress may be slow or there may be no change in behavior during treatment.

Anxiety Relief or Automatic Negative Reinforcement

There are acknowledged cases when an OCB serves the common function in OCD to reduce distress or anxiety, also referred to as automatic negative reinforcement (i.e., by performing the behavior, the removal of a stimulus in the individual's internal environment reinforces the behavior; Miltenberger, 2005).

The establishment of obsessions and compulsions can be conceptualized in the Two-Process Theory, which involves both respondent and operant processes in the development and maintenance of avoidance or fear responses (Mowrer, 1951). Through respondent conditioning, the obsessions (i.e., thoughts, images, or urges) become conditioned stimuli for a physiological fear response or distress. Through higher-order conditioning, the obsessions act as a conditioned response to the antecedent stimuli in the environment. With the chain of multiple stimulus-response pairings, conditioned stimuli elicit distress which becomes an establishing operation because the value of reducing aversive stimulation is increased, resulting in an increased

likelihood the individual will engage in a compulsion (Miltenberger, 2005). In the presence of discriminative stimuli associated with the compulsion relieving distress (e.g., the individual is alone, or cleaning or washing stimuli are present), the individual will be more likely to engage in the compulsion. The automatic negative reinforcement is a reduction in the individual's distress. The reduction in distress also strengthens the likelihood that the individual will perform the compulsion in similar environments when the individual has an establishing operation to reduce distress.

A clinical case example of this framework is outlined in Figure 2-1. Megan was an eight-year-old girl who rigidly needed to sit in the same seat during car rides. Based on topography alone, the behavior appeared to be a rule-governed behavior more typical of ASD; Megan engaged in the repetitive behavior because she enjoyed sitting in that seat of the car. Halfway through treatment, however, the clinicians learned that Megan had a contamination-related obsession associated with the behavior. Megan attended a funeral and was wearing shoes at the cemetery that she believed contaminated a car seat. This led to ongoing thoughts about the contaminated seats. The setting event of being instructed to go on a trip in the car created an establishing operation of feeling distress prior to car rides or when asked to sit in the contaminated seat. When Megan came into contact with the discriminative stimulus of the car, she was highly likely to both have the persistent thoughts of contamination (i.e., obsession) and sit in her uncontaminated seat in order to reduce her levels of distress (i.e., compulsion). The reduction in distress served as automatic negative reinforcement, increasing the probability that if Megan was similarly distressed prior to a car ride, she would continue to sit in the same, uncontaminated seat.

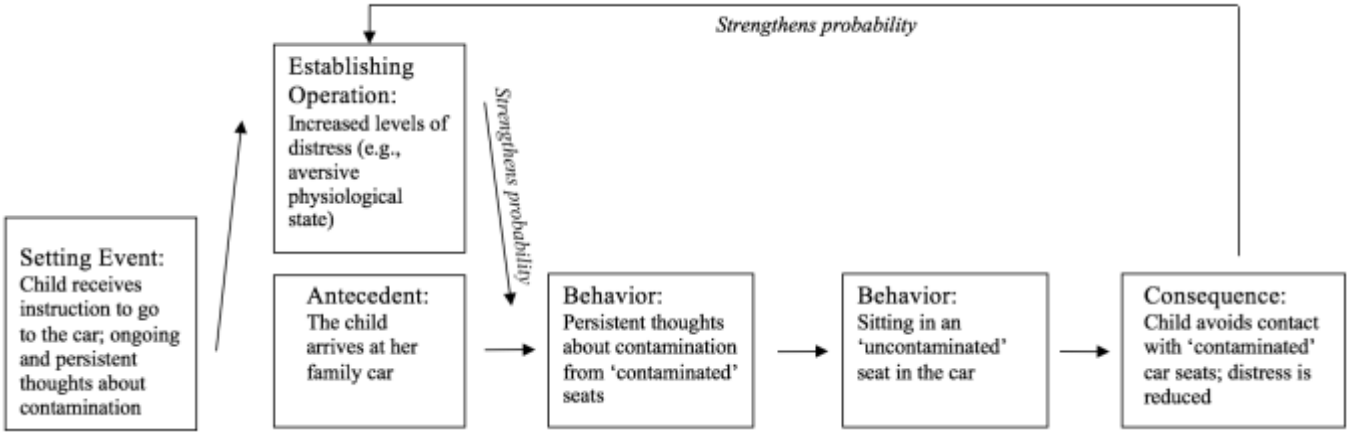

Figure 2-1. Learning mechanisms for a clinical case example typical of the processes described by obsessive compulsive disorder (i.e., automatic negative reinforcement).

The presence of heightened distress when a compulsive behavior cannot be performed can lend itself well to CBT techniques to reduce the motivating effect that distress can play on the behavior (Chok & Koesler, 2014; Miltenberger, 2005). In this clinical case, cognitive (e.g., self-statements such as "I'm the boss of you!") and behavioral components (e.g., taking deep breaths) were used to reduce distress levels associated with sitting in contaminated seats.

By providing the client with developmentally appropriate coping strategies while using exposure and response prevention (ERP) aided in decreasing the distress associated with refraining from performing the compulsion. The individual no longer has the establishing operation to engage in the compulsion when encountering the antecedents or triggers of the behavior (March & Mulle, 1998).

Other Functions Beyond Anxiety Relief

Though automatic negative reinforcement is the function common to OCD, researchers have found that automatic positive reinforcement (Rodriguez et al., 2012) and socially mediated functions (Vause et al., 2014; 2015) may play a role in the maintenance of OCBs. First, an

explanation of these functions in isolation is provided, followed by examples of how they integrate to form OCBs controlled by multiple functions in Figures 2-2 and 2-3.

Ego-syntonic or automatic positive reinforcement. In some OCBs, the individual can perform a behavior because the behavior itself produces enjoyment or a positive internal sensation for the individual (Wu et al., 2014b). Literature on other repetitive behaviors in ASD suggest that a lack of the particular stimulation, or sensory deprivation, can be an establishing operation for behaviors maintained by automatic positive reinforcement (Wilder & Carr, 1998). Given there is strong support that lower-order RRBs in ASD can be maintained by automatic positive reinforcement (Cunningham & Schreibman, 2008), it is an important consideration for OCBs.

Several studies from ABA have treated OCBs such as ordering and arranging and insistence on routines maintained by automatic positive reinforcement in children and adolescents with ASD. By teaching appropriate times to engage or refrain from the behavior (i.e., discrimination training), or using differential reinforcement procedures, clinicians have been able to reduce the occurrence of interfering OCBs (Chok & Harper, 2016; Chok & Koesler, 2014; Rodriguez et al., 2012).

Compared to OCBs, a larger body of research exists for the treatment of lower-order RRBs using ABA. Treatments such as Response Interruption and Redirection have been successful at reducing motor and verbal sterotypy in children with ASD and is considered to be efficacious as a treatment for stereotypy (Mulligan, Healy, Lydon, Moran, & Foody, 2014; Saini, Gregory, Uran, & Fantetti, 2015). In addition, antecedent interventions (e.g., matched or unmatched stimulation or competing stimuli), differential reinforcement of alternative or other

behaviors, or combinations of these procedures have been demonstrated to reduce lower-order RRBs in ASD (Mulligan et al., 2014).

Socially mediated reinforcement. Repetitive behaviors in ASD can also occur exclusively due to the responses of others to the behavior. The reinforcement can include providing attention or items to the individual (e.g., the child's mother talking to the child; social positive reinforcement), or delaying or terminating aversive events (e.g., the mother canceling a trip to the doctor or putting away homework; social negative reinforcement; Cooper et al., 2007). Establishing operations for these types of reinforcement can increase after periods of deprivation. When in the presence of discriminative stimuli and the establishing operation is in effect, the value of the reinforcer increases and the individual is more likely to engage in the behavior leading to that reinforcer. When the reinforcer is delivered following the behavior, the entire pathway is strengthened. For an example with negative reinforcement, if a boy has been doing homework for a long period of time, the value of terminating the homework increases and the probability that he will tell his parents he completed all the homework so he can engage in another activity also increases. When his parents allow him to do another activity, the boy receives negative reinforcement for saying he completed his work.

Socially mediated functions for OCBs have tended to be treated using differential reinforcement procedures (Vause et al., 2014; Vause et al., 2015). By providing the idiosyncratic reinforcement (e.g., parental attention) for engaging in coping strategies or exposures, and refraining from providing reinforcement if the child performs the OCB (i.e., extinction), the child learns to engage in the exposures and refrain from the target behavior in order to gain access to those reinforcers. The clinician can also select targets for skill building so the individual can

access these reinforcers more appropriately (e.g., learning to start and maintain conversations instead of engaging in reassurance-seeking questions).

In addition to differential reinforcement procedures, other techniques have been used to treat behavioral excesses. Noncontingent reinforcement delivers the specific reinforcer (e.g., parent attention) to the individual on a time-based schedule as opposed to as a consequence for engaging in the challenging behavior (Fisher, Piazza, & Roane, 2011). Functional communication training teaches the individual to request the reinforcer (e.g., saying, "play with me.") using a communicative response as opposed to engaging in a challenging behavior, while not providing the reinforcer following the challenging behavior. Finally, extinction is the process of withholding the reinforcer following the target behavior (Fisher, Piazza, & Roane, 2011). These techniques, while not evaluated in isolation for treating OCBs, are possible techniques for treating behaviors maintained by socially mediated reinforcers.

Combined Cases

The predominant discussion on the function of OCBs conceptualizes the behaviors to serve a single function (e.g., automatic negative reinforcement). Through treatment of children with OCBs in our lab, there have been several cases of behaviors that have multiple functions. Often, these behaviors have functions that both relieve distress and serve another purpose (e.g., automatic positive or socially mediated functions). This phenomenon is labelled as multiple control, occurring in 24.8% of functional analyses (Beavers, Iwata, & Lerman, 2013). A combination of multiple types of reinforcement strengthen the probability of the behavior, each with the possibility of unique establishing operations for each function.

Anxiety relief and automatic positive reinforcement. A case example of an OCB occurring to both relieve anxiety and for enjoyment (i.e., both automatic positive and automatic

negative functions) is described in Figure 2-2. Claire was a 13-year-old girl who repeatedly washed her hands throughout the day, often lasting in excess of 10 minutes each time. Initially, the clinicians learned Claire experienced recurrent obsessions about contamination, leading them to believe this was a behavior controlled only by automatic negative reinforcement. Opting for CBT to address the establishing operation of distress, the therapists then learned that Claire also enjoyed the sensation of the water on her skin. There were therefore multiple pathways of reinforcement acting on the behavior. When Claire experienced distress building in response to being in the area of contaminated items and experiencing contamination-related thoughts, she had a higher probability of experiencing the obsessions in that area and washing her hands for 10 minutes when she was able to go to the bathroom. By experiencing a reduction in distress following hand washing, Claire was more likely to engage in hand washing when her contamination obsessions resulted in distress. Since Claire also found the water on her hands enjoyable while her anxiety decreased, this also influenced her probability to perform the OCB.

A combination of treatment components including CBT to reduce the establishing operation of distress and finding suitable replacement behavior for the sensory reinforcement (e.g., going swimming regularly) were successful at reducing this OCB. This example also highlights how even if a behavior appears to be typical of OCD (e.g., the presence of obsessions), other functions could be influencing the behavior and impact the treatment selected for the behavior.

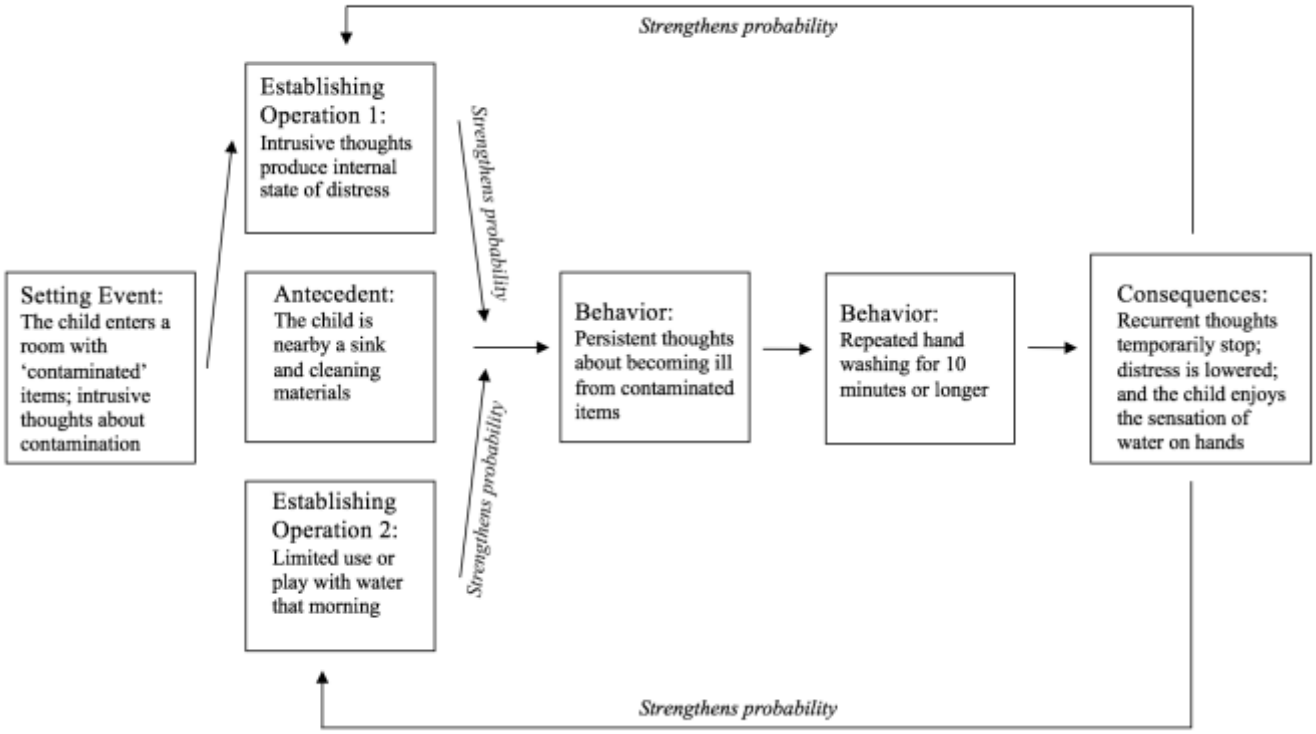

Figure 2-2. Learning mechanisms for a clinical case example involving both automatic positive and negative reinforcement.

Anxiety relief and attention. Figure 2-3 highlights a case example of an OCB maintained by both relieving anxiety and providing social attention from family members or caregivers. Austin was a 15-year-old teenager with recurrent thoughts about choking on his food and dying from not digesting his food after eating. He was not able to have reciprocal conversation with others and had no established friendships with peers, leading to low levels of social interaction. Whenever Austin ate a food item, he asked reassurance-seeking questions to his parents about dying from not digesting the food item. He also repetitively tapped his stomach following ingesting a food item as be believed this would help with the digestion process. The setting event, including the instruction to eat a meal and recurrent thoughts about choking and indigestion created an internal state of distress for Austin, an establishing operation for the OCB. This aversive internal state increased the probability and value of performing the OCB while in

the presence of his parents at mealtimes. The consequent reduction in distress served as a reinforcer and strengthened the probability that next time he was distressed at mealtimes he would engage in the OCB. His parents also responded to his questions affirming Austin was safe, providing Austin with attention. A second establishing operation was Austin's limited social interaction with others given his difficulty with conversation. The OCBs at mealtimes offered a way for Austin to access this attention, strengthening the likelihood that he would engage in the OCBs.

Treatment combined CBT components to address the obsessions and reduce the role of distress as an establishing operation, and ABA to teach Austin how to have reciprocal conversations with others (e.g., asking them about their favorite things or discussing sports). By teaching Austin how to access attention from others appropriately, this reduced his motivation to engage in OCBs in order to get attention. This example provides a case when social deficits in ASD influenced the ongoing presentation of OCBs when they evoked attention from others. A combination of strategies to reduce the OCB provided a more functional way for Austin to obtain attention from others, as well as cope with obsessions and distress. The concurrent reduction in anxiety with an increase in social skills has been observed in randomized controlled trials of CBT for children with autism and anxiety disorders (Storch et al., 2013).

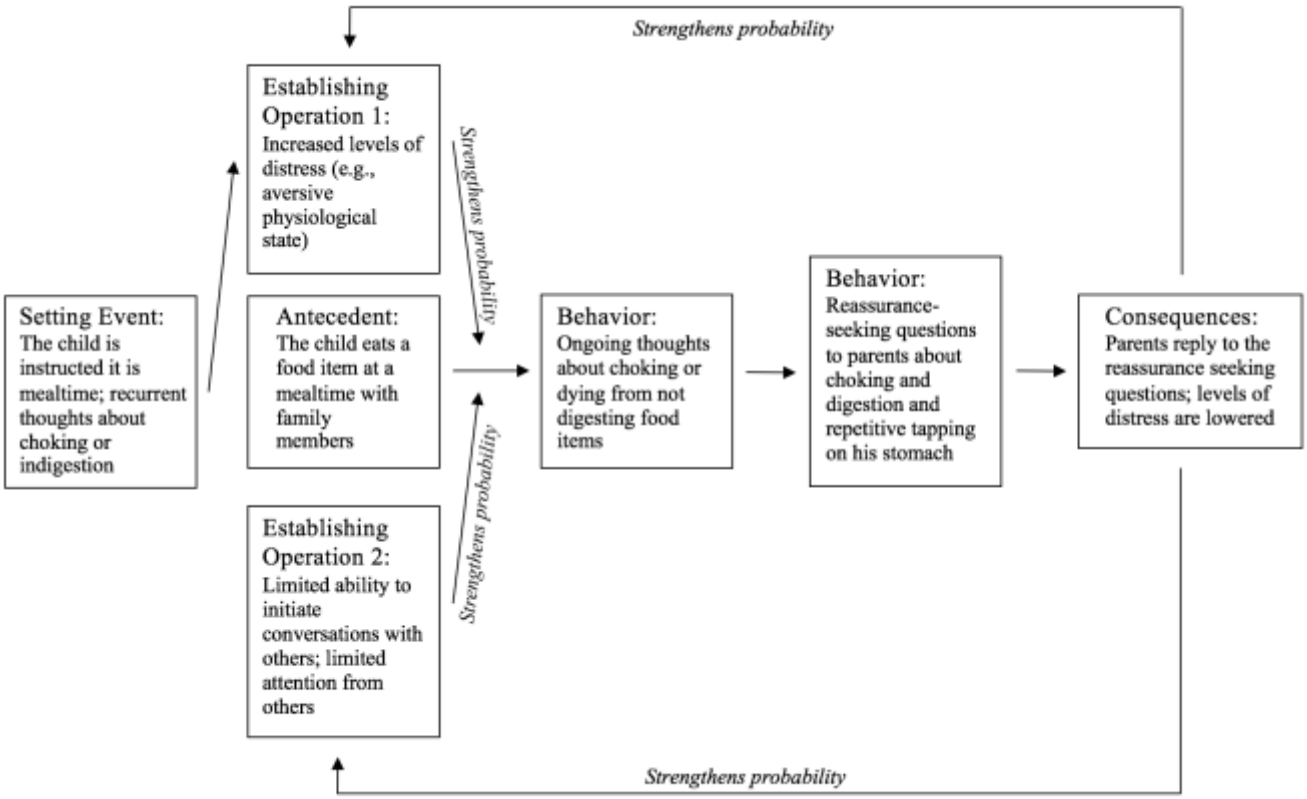

Figure 2-3. Learning mechanisms for a clinical case example involving both negative reinforcement and a secondary gain of parental attention.

Assessing Function

The above case examples illustrate how the topographic presentation of an OCB in a child with ASD does not necessarily correspond to the underlying cause or causes of the behavior. A more apparent function may also mask the presence of other functions maintaining the behavior. It is therefore recommended that some form of functional behavioral assessment be conducted prior to selecting treatment components. In behavior analysis, the established method to determine the underlying cause of a behavior is the systematic manipulation of motivating operations, antecedents, and consequences called a functional analysis (Hanley, Iwata, & McCord, 2003). Functional analyses have been used to determine the functions of higher-order RRBs including hoarding, ordering and arranging, cleaning behaviors, and rigid routines in

children and adolescents with ASD (Chok & Koesler, 2014; Kuhn et al., 2009; Rodriguez et al, 2012).

Researchers have noted, however, that functional analyses cannot measure the internal distress that acts as a critical motivating operation for compulsive behaviors (Chok & Koesler, 2014; Miltenberger, 2005). Recent studies have used physiological measures of heart rate during exposure as an approximation of distress for adolescents with limited verbal ability and ASD (Chok & Koesler, 2014; Chok & Harper, 2016). These methods more closely approach experimental confirmation of a state of distress, yet the methods required may be too cumbersome to implement within a psychosocial treatment environment due to the equipment and experimental procedures required. It may also be difficult to implement functional analyses when providing treatment in a group context given the time and resources required to complete a functional analysis for each of multiple children's OCBs.

In a treatment manual for trichotillomania, Miltenberger (2001) recommends completing an interview-based assessment in conjunction with collection of descriptive information on the events occurring immediately before and after the behavior. Interview assessments ask an informant, either the child or a parent, to comment on how often specific antecedents and consequences occur for a target behavior. Studies have used measures such as the Questions About Behavioral Function (Matson & Vollmer, 1995) to assess the functions of OCBs (Vause et al., 2014; Vause et al., 2015); however, no interview has yet been established for assessing the function of OCBs specifically. In response to the paucity of measures available, the Parent Interview for Assessing Function – Obsessive Compulsive Behavior (PIAF-OCB; Guertin, Vause, & Feldman, 2016) was developed for the purpose of assessing the functions of OCBs for the application case study (Chapter 4).

In combination with an indirect method of assessing function, the clinician or a caregiver should also directly observe the behavior occurring in the natural environment. In observing the behavior, the clinician records the antecedents and consequences (i.e., Antecedent, Behavior, Consequence [ABC] data) of a behavior immediately after they occur over a period of time (Cooper et al., 2007). Alternatively, if direct observation is not possible, the client can be asked to record their own ABC data (Miltenberger, 2001). By combining the interview responses with ABC data, the clinician can establish hypothesized functions based on the models discussed above. These results then guide the selection of function-based treatment components targeted to each specific behavior.

Discussion

From a variety of disciplines (i.e., clinical psychology, applied behavior analysis, and pharmacology), studies on the treatment of higher-order repetitive behaviors are limited (Neil & Sturmey, 2013; Boyd et al., 2012). Yet these behaviors continue to be interfering for the individual and a significant predictor of caregiver stress (Boyd et al., 2012; Harrop, McBee, & Boyd, 2016). Diagnosis of comorbid OCD for many individuals may have significant impact on the treatment modality selected, leading to use of CBT with limited emphasis on operant learning mechanisms. Ascribing OCBs to being indicative of ASD may lead to treatment using principles of ABA, which has limited techniques to mitigate the distress that may be motivating the individual to engage in the OCBs (Miltenberger, 2005). By remaining invested in only one treatment modality to treat OCBs, clinicians may be missing treatment components that benefit people with ASD such as coping strategies to lower distress, or strategies aimed at disrupting other operant learning mechanisms.

Emerging studies are acknowledging the multiple or combined purposes OCBs may serve an individual with ASD. A recent preliminary randomized, controlled trial demonstrated that an individualized treatment plan CBT treatment and function-based methodology was successful at reducing OCBs when treatment is informed by indirect and direct assessments of each individual behavior (Vause et al., 2015). Other single case design studies have used functional analyses and assessments of heart rate to approximate distress in individuals engaging in OCBs, using these assessments as a guide to selecting function-based strategies including exposure and response prevention (Chok & Harper, 2016; Chok & Koesler, 2014). Assessment of establishing operations also guides the clinician in the selection of skill building targets, for example functional replacement behaviors, incompatible behaviors, or replacement behaviors. The assessments may also guide the clinician to provide parent training in addressing the function of OCBs. Further research is required to compare the efficacy, efficiency, and social validity of multimodal treatments individualized to the functions of each presenting OCB to single treatment modalities.

Some perceived limitations of this approach for assessing and treating behaviors persist. First, assessing each behavior individually may require more time and effort for the clinician and client. However, by completing individualized assessments of the mechanisms responsible for each behavior, treatment may be more efficient by only using treatment components associated with the perceived underlying causes of the behavior. In addition, the validity of indirect assessments combined with direct observation has not yet been evaluated for OCBs. Second, the use of multiple treatment modalities requires additional competencies and training in order to complete both types of interventions effectively. Alternatively, clinicians could work on multidisciplinary teams as required to provide the appropriate intervention components.

Third, the individual assessment of OCBs may not immediately provide further clarification of the diagnostic distinctions between OCD and ASD; indeed, the presentation of multiple functions across OCBs may further complicate the discussion of differential diagnosis. However, the assessment of function plays an important role in understanding the ongoing presentation of OCBs. The acknowledgement of a variety of functions beyond the presently discussed ego-syntonic and ego-dystonic functions will bring more comprehensive information to the discussion. With ongoing research into the assessment of functions of specific OCBs, diagnostic guidelines may emerge and shed further light on this issue.

Future research should continue to study the treatment protocols emphasizing individualized intervention for OCBs. Formalized assessments and protocols for determining the function of OCBs should be created and tested compared to the experimental manipulation of contingencies (i.e., functional analysis) when possible. The integration of valid functional behavioral assessments to psychosocial treatment environments may be shown to be a critical contribution to the treatment of OCBs. Adaptation of the established treatment packages to more diverse populations of ASD (e.g., young children, adolescents, and adults, presence of intellectual disability) or settings (e.g., clinics, homes, or schools) will evaluate the broader applicability of the treatment. Consumer satisfaction of this combined protocol relative to single modality treatments will also provide information about the acceptability of combined treatments to the clients receiving treatment.

Conclusion

The overlapping topography of higher-order RRBs in ASD and symptoms of OCD lead to difficulties for the assessment and measurement of the behaviors. Behaviors that appear to serve functions characteristic of OCD may be serving another function or is multiply controlled.

This paper offers an overview of a function-based framework to guide the clinician in navigating multiple treatment options offered by CBT and ABA. Assessments of the environmental variables occurring with the OCBs can be incorporated into clinical practice by using interviewing and direct observation techniques. Further research is required to refine standardized measures, assessments, and treatments for OCBs in children with ASD.

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Chapter 3: Extended Literature Review for Treatment of Obsessive Compulsive Behavior in a Preschooler with Mild Intellectual Disability

Intellectual disability (ID) is a neurodevelopmental disorder characterized by impairments in intellectual and adaptive functioning in practical, social, and conceptual domains with an onset of symptoms during the developmental period (American Psychiatric Association, 2013). Repetitive behaviors are characteristic of several populations with frequently comorbid ID, including people with autism spectrum disorder (ASD) and genetic syndromes. Repetitive behaviors can take the form of compulsions, rituals, motor stereotypy, verbal stereotypy, preoccupations, or obsessions. Studies have shown unique behavioral profiles of repetitive behaviors in people with intellectual disability (ID) depending on the etiology of the ID (e.g., ASD, Prader Willi Syndrome, Fragile X syndrome, or heterogeneous etiologies; Moss, Oliver, Arron, Burridge, & Berg, 2009).

Compared to children and adults with ASD, relatively little is known about the prevalence of higher-order repetitive behaviors in children with intellectual disabilities. Researchers have compared children with ASD and developmental disabilities using the Repetitive Behavior Scale – Revised (RBS-R; Bodfish, Symons, & Lewis 1999). Children with ASD had significantly higher ratings on the Ritualistic, Sameness, and Compulsive subscales of the RBS-R, but parents of children with developmental delay indicated these behaviors are prevalent (Boyd et al., 2010). While the prevalence and rated severity of obsessive compulsive symptoms in developmental disability may be lower than that of children with ASD, a treatment package that is robust to the needs of children with a variety of primary diagnoses could meet the needs of different populations experiencing OCBs.

Most research on interventions for higher-order RBs for children with ID involves comorbid diagnoses of ASD. This is not surprising given approximately 65% of persons with ASD meet criteria for ID (Hall, 2013). Research into the characteristics of RRBs using the RBS-R (Bodfish et al., 1999) show that topographies of RRBs load onto two factors: lower-order RRBs and higher-order RRBs (Bishop, Richler, & Lord, 2006; Mirenda et al., 2010, Richler, Huerta, Bishop, & Lord, 2010; Mooney, Gray, & Tonge, 2006). Lower-order RRBs include behaviors such as stereotypy, self-injurious behaviors, or repetitive use of objects; higher-order RRBs include insistence on sameness or routines, rituals, and compulsions (Richler et al., 2010). The separation of these categories of RRBs has been helpful to discover the differential genetic and developmental influences on higher-order RRBs when compared to lower-order RRBs (Richler et al., 2010; Cannon et al., 2010; Abramson et al., 2005).

Prevalence and Development of Higher-order RRBs in ASD

Approximately 85% of children with ASD aged one to four years displayed higher-order RRBs, and parents of children with an autism diagnosis reported on average two subtypes of higher-order RRBs categories as measured by the Autism Diagnostic Interview – Revised (Lord, Rutter, & Le Couteur, 1994; Mooney et al., 2006). Bishop et al. (2006) found that parents reported their children with ASD engaged in higher-order RRBs such as insistence on sameness as young as two years of age. Parent reports of higher-order RRBs were significantly predicted by age; the prevalence of compulsions or rituals ranged from 35 to 56%, difficulties in changes to routine were reported in 45 to 55% of children with ASD, and resistance to changes in the environment ranged from 17 to 22% of children with ASD aged 3 to 5 years (Bishop et al., 2006). An analysis of the developmental trajectory of higher-order RRBs was conducted longitudinally for children with ASD (Richler et al., 2010). Higher-order RRBs showed an

inverse quadratic pattern, with the ratings of higher-order RRB severity increasing and then stabilizing at approximately 5 years; the period of fastest increase of higher-order RRB severity occurred between 2 and 5 years of age (Richler et al., 2010). Higher-order RRBs are therefore prevalent and increasing in prevalence across early childhood. Given the behaviors are increasing to stable levels around age 5 and do not show patterns of decrease beyond this age, treatment should focus on treating higher-order RRBs in early childhood. Treatment options for this age group are particularly important considering higher-order RRBs may have significant developmental implications for the children with ASD experiencing them.

Implications of RRBs for Young Children with ASD

In a review of RRBs in ASD and associated treatments, Boyd and colleagues (2012) suggest that due to the interference of RRBs with key developmental experiences in a variety of domains, RRBs could have cascading negative effects on developmental outcomes. Studies also reveal that RRBs can be a significant stressor to family and caregivers (Boyd et al., 2012; Gabriels, Cuccaro, Hill, Ivers, & Goldson, 2005). In a sample of 14 children with ASD, parents reported stress levels were significantly and strongly correlated with total parent-rated RRBs (r = .84; Gabriels et al., 2005). In addition, a longitudinal study showed that parent ratings of RRBs in their 3- to 5-year-old children with ASD were a significant explanatory variable for their own stress levels; this relationship was also significant with change scores for RRBs and caregiver stress levels over time (Harrop, McBee, & Boyd, 2016). While the research about the developmental and familial implications for children with OCBs combines all RRBs into analyses, OCBs are prevalent in young children with ASD and do not show patterns of decreasing symptoms (Bishop et al., 2006; Richler et al., 2010; Mooney et al., 2006). Research into effective interventions aimed at early intervention when higher-order RRBs develop would

therefore be critical for young children to mitigate the effect of OCBs on caregiver stress and the developmental outcomes.

The analysis of higher-order RRBs as a distinct category of RRBs in ASD has important implications for study and treatment: factor analysis studies reveal that measures of RRBs show factor loading on insistence on sameness and routine, rituals, and compulsions (Mirenda et al., 2010; Mooney et al., 2006; Bishop et al., 2006); the developmental trajectory shows a unique pathway for higher-order RRBs (Richler et al., 2010); and the relative frequencies of higher-order RRBs show an increase in prevalence across early childhood (Bishop et al., 2006; Richler et al., 2010). In addition, when surveying treatment options for higher-order RRBs, a crucial observation is the similarity in topography between higher-order RRBs in ASD and compulsions in obsessive-compulsive disorder (OCD; Wu, Rudy, & Storch, 2014, Scahill & Challa, 2016; Stone & Chen, 2015).

Obsessive-Compulsive Disorder

The diagnostic criteria for OCD include the presence of obsessions, compulsions, or both and interfere with at least an hour of the individual's day (APA, 2013). Obsessions create anxiety and physiological reactions in the individual; in order to decrease the anxiety or associated physiological responses, a person engages in a compulsive behavior (e.g., arranging objects in a particular orientation) in order to relieve anxiety (APA, 2013). Obsessions and compulsions considerably interfere with the individual's home and school life and can have developmental consequences for children with pediatric-onset OCD (Valderhaug & Ivarsson, 2005). Children with early-onset pediatric OCD are at greater risk for other comorbid psychiatric disorders such as attention deficit hyperactivity disorder, tic disorder, and anxiety disorders (Garcia et al., 2009). Early treatment could help to mitigate the missed opportunities for development and risk

for comorbid diagnoses in this population, therefore it is crucial to deliver treatment to younger populations with OCD (Freeman et al., 2012).

Differential Diagnosis

There is considerable debate between researchers about whether or not a person with ASD can be diagnosed with comorbid OCD given the overlap of diagnostic criteria in the Diagnostic and Statistical Manual – 5th Edition (DSM-5; APA, 2013, Stone & Chen, 2015). The DSM-5 states that OCD can include only compulsions, but these compulsions cannot be otherwise explained by a diagnosis of ASD (APA, 2013).

Some argue that the underlying mechanisms of higher-order RRBs are different than the ones involved in OCD (Wu et al., 2014; Scahill & Challa, 2016). Higher-order RRBs are described as having an automatic positive function: these behaviors occur as a result of the enjoyment of the individual (e.g., arranging objects provides a positive internal state for the individual; Wu et al., 2014; Paula-Pérez, 2013). Compulsions in OCD, however, are considered to serve an automatic negative function: the individual engages in the behavior to relieve a negative internal state as a result of obsessions (e.g., a person arranges objects in order to relieve an obsession about neatness and the corresponding anxiety; APA, 2013; Scahill & Challa, 2016; Wu et al., 2014). This is the basis that many argue that ASD and OCD, while overlapping in topography of the behavior (i.e., higher-order RRBs can look similar to compulsions in OCD), are distinct and functionally dissimilar phenomena (Paula-Pérez, 2013). The distinction in function, however, does not preclude some higher-order RRBs in ASD from serving the same function as a compulsion in OCD—meriting a comorbid diagnosis of OCD. Diagnostic criteria based on a purely topographical description of higher-order RRBs are therefore problematic. The difficulty for differential diagnosis lies in parsing apart the functions of the repetitive behaviors

in question (Paula-Pérez, 2013; Zandt, Prior, & Kyrios, 2007). Adding to the complexity of diagnosis, people with ASD can have difficulty reporting the internal states associated with RRBs that would be critical for distinguishing between automatic positive and negative functions (Zandt et al., 2007).

The view of two distinct automatic functions for each category of repetitive behaviors in OCD and ASD (i.e., automatic positive and negative reinforcement) conflicts with research that demonstrates RRBs could be maintained by several variables in individuals with ASD, including both social and automatic functions (Vause, Neil, Yates, Jackieswicz, & Feldman, 2015; Ollington, Green, O'Reilly, Lancioni, & Didden, 2012; Rodriguez, Thompson, Schlichenmeyer, & Stocco, 2012; Wu et al., 2014). A subset of higher-order RRBs for individuals with ASD may then constitute behaviors that are topographically similar but functionally dissimilar to compulsive behaviors in OCD. It is suggested, then, that treatment of RRBs in people with ASD be individualized to the particular behavior (e.g. reassurance seeking) and sensitive to the underlying variable that maintains the particular behavior (e.g., attention from parents; Scahill & Challa, 2016). In order to develop treatments for the repetitive behaviors that are likely maintained by obsessions or anxiety (i.e., automatic negative function), but are also sensitive to additional functions, an option is to define higher-order RRBs as Obsessive Compulsive Behaviors (OCBs; Vause et al., 2015). Treatment would address all OCBs, focusing on strategies to manage obsessions and anxiety related to OCBs while also assessing all possible functions of repetitive behavior (Wu et al., 2014; Vause et al., 2015).

Functional Behavioral Assessment and Intervention

The functional behavioral assessment of challenging behaviors in people with intellectual disability including ASD has been well established as an effective first step towards efficacious

individualized treatment (Matson & Williams, 2014; Roane, Fisher, & Carr, 2016). Studies on the reduction of repetitive behaviors such as stereotypy have shown that function-based interventions (i.e., interventions informed by functional assessment or analysis) are "promising" or "efficacious" (Mulligan, Healy, Lydon, Moran, & Foody, 2014). More specifically with OCBs, treatments informed by functional analyses (e.g., functional communication training, or extinction) for young adults with ASD were able to reduce OCBs to desired levels (Rodriguez et al., 2012; Kuhn, Hardesty, & Sweeney, 2009). Rispoli, Camargo, Machalicek, Lang, and Sigafoos (2014) conceptualized the ability to perform OCBs (e.g., arranging or stacking objects, following a routine upon arrival at school) as a maintaining variable for challenging behaviors in three preschool-aged children with ASD; functional communication training aimed at requesting an opportunity to engage in the OCB was successful at thinning the reinforcement schedule, indirectly lowering the frequency of engagement in the OCB. Functional analyses and subsequent interventions are therefore successful at decreasing OCBs in youth, and may indirectly show decreases in OCBs in preschool-aged children with ASD.

While experimental functional analyses (EFA) are considered by many behavior analysts to be the hallmark of assessing the function of a behavior (Hanley, Iwata, & McCord, 2003), indirect assessment and direct observations have practical advantages for the investigation of correlated events for the clinician with limited resources such as time, space, staff, or training in ABA techniques (Matson, 2014; Matson & Williams, 2014). In addition, when addressing behaviors that may serve an automatic negative function, functional analyses may not capture the idiosyncratic variables required to evoke the emotional state and there is no way to objectively measure the internal state created by an EFA condition (Miltenberger, 2005).

Increasingly, researchers are using or calling for functional behavioral assessment and analyses to identify the functions of behaviors associated with other psychiatric diagnoses (Miltenberger, 2001; Sturmey, 2007). Miltenberger (2001) suggests open-ended behavioral interviewing as part of a habit reversal treatment package for trichotillomania. In a case study with a 6-year old girl presenting with persistent thumb sucking and hair pulling self-injurious behaviors, behavioral interviewing was used to identify the idiosyncratic events (e.g., watching television) correlated with the target behaviors (Long, Miltenberger, & Rapp, 2000). Differential reinforcement of other and alternative behaviors plus response cost during conditions identified in the behavioral interview were successful at reducing both behaviors (Long et al., 2000). Further research is necessary into the efficacy of functional behavioral assessments and intervention for challenging behaviors of other psychiatric disorders (Sturmey, 2007). Additionally, there is limited research about the utility and psychometric properties of interview measures such as the Functional Assessment Interview (FAI; O'Neill et al., 1997) for assessing functions of behavior (Matson, 2014), therefore it is important to investigate interview measures in the context of treating OCBs.

Adapting CBT for OCBs in Young Children

Extensive research has demonstrated that CBT can be effective at reducing obsessive-compulsive symptoms in school-age children with pediatric OCD (Rosa-Alcázar et al., 2015; Sánchez-Meca, Rosa-Alcázar, Iniesta-Sepúlveda, & Rosa-Alcázar, 2014). Recent research has developed strategies to deliver CBT treatment to preschool-aged children (i.e., approximately 3 to 6 years of age) with early-onset psychiatric disorders (Hirshfeld-Becker, Micco, Mazursky, Bruett, & Henin, 2011). Adaptations to existing treatment packages for developmental appropriateness (e.g., incorporation of interactive activities, more graduated progression on

exposure hierarchies, or decreased reliance on written materials) have shown promising results anxiety disorders and OCD (Freeman et al., 2008; Hirshfeld-Becker et al., 2011).

Anxiety disorders. In an open trial of a modified CBT program for children 3 to 7 years of age with anxiety disorders (including 8 with a diagnosis of OCD), significant improvements were reported after children and their parents attended an average of 8.3 weekly sessions (Minde, Roy, Bezonsky, & Hashemi, 2010). Hirschfield-Becker and colleagues (2010) conducted a randomized control trial (RCT) of a manualized treatment designed for treatment of anxiety disorders in 4 to 7 year old children. Following treatment, participants who received treatment showed significantly fewer anxiety diagnoses than controls (Hirshfeld-Becker et al. 2010). More recently, a pilot RCT for online delivery of an 8-session treatment program for anxiety disorders in children aged 3 to 6 years revealed no significant difference between pre- and post-intervention primary anxiety diagnoses, but at a 6-month follow-up, 70.6% of experimental children no longer had their primary anxiety diagnosis (Donovan & March, 2014). Treatment using CBT can therefore be efficacious in multiple modalities for a younger population of children with anxiety disorders; adjustments made to these treatment packages for preschool-aged children could therefore be helpful to inform the development of new protocols of OCBs in young children with ASD or ID.

Pediatric OCD. Some studies have adapted CBT interventions for early-onset pediatric OCD. Freeman and colleauges (2008) conducted a preliminary RCT of 42 children aged 3 to 8 years with OCD randomly assigned to receive family-based CBT or relaxation training (RT). The intervention consisted of 10 weekly sessions followed by two biweekly sessions, with two sessions delivered only to parents. Sessions included psychoeducation, cognitive skills training, exposure and response prevention (ERP), and parent training. After treatment, completer

analyses showed significant reductions in CY-BOCS (Goodman, Price, Rasmussen, Riddle, & Rapoport, 1986) with a large effect size (d = 0.85). In the completer analyses, 69% of participants who received CBT achieved clinical remission based on CY-BOCS scores compared to 20% of participants who received RT. This study therefore highlights that CBT treatments can improve OCD symptoms in young children.

Another preliminary RCT built on the work of Freeman and colleagues (2008) with the aim of decreasing the number of weeks required to show treatment gains (Lewin et al., 2014). Thirty-one children aged 3 to 8 years with OCD were randomized to attend two therapy sessions per week with their parents for six weeks or continue with treatment as usual (TAU). The treatment focused primarily on exposure and response prevention (ERP) as opposed to other cognitive-based strategies as well as an increased focus on family accommodation of compulsions (i.e., when the family performs compulsions for the child). Treatment remission rates were 59% for the experimental group and 0% for control group. A brief, family-based ERP program is therefore able to significantly reduce the incidence of OCD in young children.

CBT for children with ASD. To date, only one study adapted CBT for preschool-aged children with ASD. A pilot RCT assessed a group-based CBT treatment package called *Exploring Feelings* (Sofronoff, Attwood, & Hinton, 2005; Sofronoff, Attwood, Hinton, & Levin, 2007) designed for emotion regulation (i.e., reduction in anger and anxiety) with 11 children with ASD (Scarpa & Reyes, 2011). Children aged 5 to 7 years were randomly assigned to immediate or delayed treatment. The treatment consisted of 9 weeks of one-hour group therapy sessions aimed at teaching children about recognizing and managing emotions using relaxation, social, and cognitive strategies. While children were in therapy groups, parents received psychoeducation and consultation about the implementation of the strategies at home.

Adaptations for younger children included shortened sessions from two- to one-hour sessions, and the use of age-appropriate activities such as singing, games, and crafts to deliver information (Scarpa & Reyes, 2011). Group analyses revealed a significant difference in the frequency and duration of anger or anxiety episodes per hour between participants who received and were waiting for treatment. When both groups were combined for pre-post analyses, children showed significant improvements after they received treatment on the Emotion Regulation Checklist (Shields & Cicchetti, 1997), responses to hypothetical vignettes, and ratings of self-confidence with handling anger and anxiety. This study shows preliminary evidence that CBT for young children with ASD can decrease outbursts and increase the knowledge and use of emotion regulation strategies.

Some case studies have shown that CBT may help to reduce OCBs in younger children with ASD. A brief case series including two young children with ASD aged 5 and 6 years using ERP techniques (e.g., preoccupation with clocks and timers, insistence on dumping bins of items) were only moderately successful at decreasing the rate of engagement in OCBs (Boyd, Woodard, & Bodfish, 2013). Another case study of a child 7 years of age with ASD and OCBs (e.g., hoarding and frequent hand washing) was based on the March and Mulle protocol (1998) for pediatric OCD (Reaven & Hepburn, 2003). Modifications to suit a participant with ASD included incorporation of the individual's interests, parents incorporated into the delivery of treatment, visual strategies to illustrate strategies as 'tools', and the use of social stories (Reaven & Hepburn, 2003). The participant showed a 65% reduction in OC symptoms that were maintained at follow-up sessions 3 and 4 weeks following treatment (Reaven & Hepburn, 2003). These studies show preliminary evidence that CBT can help to reduce OCBs in younger children

with ASD, but do not address the additional socially-mediated or automatic functions of OCBs in ASD (Wu et al., 2014; Ollington et al., 2012).

School-based CBT interventions. To date, few studies include treatment based in the school. Sloman, Gallant, and Storch (2007) outline a model for school psychologists to assess and treat pediatric OCD in a school environment. While the model follows empirically validated CBT treatments for OCD, it has not yet been evaluated in the school setting. Evaluation of the efficacy and feasibility of CBT treatments when delivered in the school environment is needed.

Combined treatment packages. Interventions combining functional behavior-based assessment and intervention and CBT (Fb-CBT) for school-age children with ASD and OCB have shown success at reducing OCBs in both individual and group-based therapy settings (Vause, Hoekstra, & Feldman, 2014; Vause et al., 2015). An indirect assessment (Questions About Behavioral Function; Matson & Vollmer, 1995) and direct observations were included to generate hypothesized functions, and individualized treatment plans addressing the functions were implemented (Vause et al., 2014; 2015). Psychoeducation, mapping (PM) OCBs, establishing a hierarchy of OCBs, cognitive skills training, ERP strategies, and positive reinforcement for completing exposures were incorporated to provide support for OCBs that were maintained by the relief from anxiety or other negative internal states (e.g., obsessions; Vause et al., 2015).

A preliminary RCT of group Fb-CBT was conducted by Vause and colleagues (2015). Fourteen children aged 7 to 12 years with ASD and an IQ over 70 attended the intervention with one or more of their parents. The children's and clinician's manuals *I Believe in Me, Not OCB!* (Vause et al., 2013) consisted of a 9-week treatment combining CBT components as described by March and Mulle (1998), as well as indirect and direct behavioral assessment, followed by

individualized treatment plans for hypothesized functions of OCB (Cooper, Heron, & Heward, 2007; Vause et al., 2015). Analyses revealed significant time by group interactions on the CY-BOCS (Goodman et al., 1986) and RBS-R (Bodfish et al., 1999). Parent daily ratings of OCBs showed a significant decrease between baseline and individualized treatment phases (Vause et al., 2015). Differences between baseline and follow-up approached significance, and differences between PM and follow-up were significant (Vause et al., 2015). Preliminary evidence suggests that the manualized Fb-CBT treatment package adapted for children with ASD can reduce OCBs in school-age children with ASD and OCBs.

Conclusion

Though not a diagnostic criterion of ID, repetitive behaviors including OCBs are prevalent in a variety of etiologies of ID (Moss et al., 2009). While there is limited research on the prevalence and treatment of OCBs in children with ID, research has shown in ASD populations that OCBs increase and then stabilize at around 5 years of age (Richler et al., 2010). The impact of OCBs can include interference with social and educational opportunities, as well as increased stress for caregivers (Boyd et al., 2012; Harrop et al., 2016). It is therefore important to determine effective treatments for reducing OCBs at a young age and in a variety of populations.

Treatment studies of OCBs have come from primarily CBT and ABA modalities. Studies implementing CBT in typically developing children with anxiety or pediatric OCD have been successful at reducing symptoms in preschool-aged children (Freeman et al., 2008; Hirshfeld-Becker et al., 2010). In addition, OCBs in older children and adolescents with ASD were successfully treated with procedures based in ABA, including functional communication training (Rispoli et al., 2014). Given that the underlying function of OCBs is not clear based on

topography alone, functional behavioral assessment is recommended within a treatment that can address all possible functions including automatic negative reinforcement (Vause et al., 2015). The functional behavioral assessment then provides the clinician with a clearer picture of the necessity of CBT, ABA, or a combined treatment specific to the individual's needs.

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Treating Obsessive Compulsive Behavior and Enhancing Peer Engagement in a Preschooler with Mild Intellectual Disability

Chapter 4: Treating Obsessive Compulsive Behavior and Enhancing Peer Engagement in a Preschooler with Mild Intellectual Disability

Abstract

Intellectual disability (ID) is a neurodevelopmental disorder characterized by impairments in cognitive and adaptive functioning in social, practical, or conceptual domains. Individuals with ID often present with higher-order repetitive behaviors such a need for sameness, ritualistic behaviors and compulsive behaviors. These behaviors are often referred to as Obsessive Compulsive Behaviors (OCBs) and are shown to increase in prevalence from age 2 to 5 years. This study aimed to decrease two higher-order repetitive behaviors and concomitantly increase play skills in a 4-year-old boy with mild ID in a preschool setting. The intervention consisted of a modified version of Functional Behavior-based Cognitive Behavior Therapy (Fb-CBT). In a multiple baseline across behaviors design, Fb-CBT eliminated target behaviors and increased the duration of peer social engagement. This study expands the research supporting the efficacy of a modified Fb-CBT package for treating preschool children with neurodevelopmental disorders other than autism spectrum disorder who exhibit OCBs.

Introduction

Intellectual disability (ID) is a neurodevelopmental disorder characterized by impairments in intellectual and adaptive functioning in domains of practical, social, and conceptual skills with an onset of symptoms during the developmental period (*DSM-5*; American Psychiatric Association, 2013). While not part of the diagnostic criteria for ID, repetitive behaviors (RBs) are characteristic of several populations with frequently co-occurring ID, including people with autism spectrum disorder (ASD), genetic syndromes, and ID of heterogeneous causes (APA, 2013; Moss, Oliver, Arron, Burridge, & Berg, 2009). Repetitive

behaviors can take the form of compulsions (e.g., checking or arranging), rituals (e.g., bedtime routines), stereotypy (e.g., repetitive body movements), preoccupations (e.g., restricted interests), or obsessions (e.g., repetitive thoughts or urges). Unique behavioral profiles of RBs are found in people with varying known etiologies of ID (e.g., ASD, Prader Willi Syndrome, Fragile X syndrome; Moss et al., 2009). Factor analytic studies of RBs have identified at least two broad categories: higher-order RBs, including insistence on sameness, ritualistic, and compulsive behaviors, and lower-order RBs, including motor stereotypy and self-injurious behaviors (Mirenda et al., 2010; Mooney, Gray, & Tonge, 2006).

There is a paucity of research on the impact of, and interventions for, higher-order RBs in persons with ID. Most research on interventions for higher-order RBs for children with ID involves children with comorbid diagnoses of ASD. This is not surprising given approximately 65% of people with ASD meet criteria for ID (Hall, 2013) and the prevalence of ASD is approximately 1 in 68 (Centre for Disease Control, 2012). Parents of young children with ASD and ID report higher-order RBs as early as two years of age (Bishop et al., 2006). In a study of children between one to four years old with ASD, 85% of participants displayed higher-order RBs (Mooney et al., 2006). Higher-order RBs show a developmental trajectory, with levels increasing until stabilizing when children are five years old (Richler et al., 2010). There is evidence that engagement in RBs can have cascading negative developmental outcomes due to missed social and developmental opportunities (Boyd, McDonough, & Bodfish, 2012). In addition, parent-reported stress is significantly related to the presence of and changes in RBs over time in their preschool-aged children with ASD (Harrop, McBee, & Boyd, 2016). Reduction of RBs, especially with early intervention, may be effective in mitigating negative developmental and parental outcomes (Boyd et al., 2012).

Topographies of higher-order RBs are similar to obsessions and compulsions typically characteristic of Obsessive Compulsive Disorder (OCD; APA, 2013; Wu, Rudy, & Storch, 2014). It is theorized that compulsions function to relieve aversive internal states brought on by obsessions in OCD (i.e., automatic negative reinforcement; Miltenberger, 2005; Wu, Rudy, & Storch, 2014). In these cases, an aversive internal state (i.e., distress) would serve as an establishing operation (EO) for compulsive behaviors, increasing the value and likelihood of engaging in the compulsion to lower the aversive internal state (Chok & Koesler, 2014; Miltenberger, 2005). In ASD or ID, automatic positive reinforcement or socially mediated functions may also influence higher-order RBs, making it difficult to distinguish between higher-order RBs and compulsive behaviors (Vause, Hoekstra, & Feldman, 2014; Vause, Neil, Jaksic, Jackiewicz, & Feldman, 2015). Adding to this difficulty, children with ASD or ID and limited communication ability may not be able to identify or communicate the internal states associated with the behavior (Chok & Harper, 2016). Given the above, these behaviors have been termed obsessive compulsive-like or obsessive compulsive behaviors (OCBs; Chok & Harper, 2016; Vause et al., 2015).

Despite the negative consequences of repetitive behaviors for children and their parents, treatment studies for higher-order RBs are sparse (see review in Neil & Sturmey, 2014). A few behavior analytic studies using single subject experimental designs have evaluated treatments for children and adolescents with ASD and ID (Kuhn, Hardesty, & Sweeney, 2009; Rodriguez et al., 2012; Sigafoos, Green, Payne, O'Reilly, & Lancioni, 2009). For instance, Chok and Harper (2016) used a treatment for arranging and ordering with a 12-year-old girl. Informed by a functional analysis and physiological assessment of heart rate to rule out distress as an EO, results indicated that the arranging behaviors were maintained by automatic positive

reinforcement and there was no difference in heart rate between control and EO conditions (i.e., response blocking from engaging in the target behavior). A discrimination training procedure was successful at bringing the arranging behaviors under the control of schedule correlated stimuli.

Studies have also adapted exposure and response prevention (ERP) techniques (often used in cognitive behavior therapy) for children and adolescents with ASD and ID. ERP is the process by which an individual is exposed to stimuli associated with compulsive behaviors and refrains from engaging in the behavior (March & Mulle, 1998). Using an ERP procedure, Chok and Koesler (2014) treated a participant with ASD and severe ID engaging in repetitive cleaning behaviors. A physiological difference in heart rate was observed when the participant was prevented from cleaning, leading to a hypothesis that the behavior had an automatic negative function. By prompting engagement with items left on a table and blocking attempts to clean, the authors were able to decrease rates of cleaning to near-zero levels. Boyd and colleagues (2013) modified ERP techniques for children aged 5 to 11 years with ASD and ID. The authors reported mixed results using trials of exposure and gentle redirection to other tasks, with only two of five participants showing a marked change in duration or latency to engage in OCBs. Overall, the emerging evidence suggests that ERP may be effective at decreasing OCBs in children with ASD and ID, but more research is needed.

Recent research combined behavior analytic and cognitive behavior therapy (CBT) treatment methodologies individually and in groups for school-age children with ASD without ID in order to target OCBs serving a variety of functions (Vause et al., 2014; 2015). The manualized treatment *I Believe in Me, Not OCB!* (Vause et al., 2013) consisted of a nine weekly 2-hour sessions of Functional Behavior-based CBT (Fb-CBT) designed for parent-child dyads,

treated in small groups. Analyses of a preliminary randomized controlled trial identified significant time by group interactions on standardized measures of OCBs, with medium to large effect sizes (Vause et al., 2015). Preliminary evidence suggests that the manualized Fb-CBT treatment package adapted for children with ASD can reduce OCBs in school-age children. Research is lacking on using the Fb-CBT package with preschool children with ID and looking at collateral gains such as increases in social behaviors.

Purpose

This study extends current treatment research of OCBs by adapting the Fb-CBT package for (a) a younger child, (b) mild ID, (c) therapist-led intervention in a preschool classroom, and (d) incorporation of social skills goals. A concurrent multiple baseline design across two OCBs was used to determine if there was a functional relationship between the treatment, decreases in the occurrence of OCBs, and gains in the duration of engagement with peers. The treatment included considerations for age, cognitive functioning, and working collaboratively with teachers as mediators. Adaptations included removing psychoeducation and cognitive components, focusing treatment primarily on function-based interventions, antecedent strategies, and modified ERP components of Fb-CBT. It was hypothesized that treatment would produce clinically significant reductions in occurrence of OCBs, and increases in duration of peer engagement, and the intervention would be considered effective by mediators.

Method

Participant

The participant was a 4-year-old boy who met research criteria for a Mild Intellectual Disability. Max (pseudonym) scored in the extremely low range ($IQ \leq 69$) on the Weschler Preschool and Primary Scale of Intelligence – Fourth Edition (WPPSI-IV; Weschler, 2012) and

low (standard score: 20 to 70) and moderately low (standard score: 71 to 85) ranges, respectively, on the Communication and Socialization subdomains of the Vineland Adaptive Behavior Scales – Second Edition (Vineland-II; Sparrow, Cicchetti, & Balla, 2005). These assessments were conducted by a PhD student in Clinical Psychology with four years' of experience conducting standardized assessments under the supervision of the second author (who has a PhD in Clincial Psychology and over 20 years of clinical experience). Max's expressive communication consisted mainly of requests and repetitive questioning, with articulation difficulties. As a single parent with time constraints in the home, Max's mother preferred preschool-based treatment. Over the course of the study, Max was undergoing speech and language therapy (not focusing on his OCBs); he was not taking medications or receiving any other services.

Setting

The treatment took place in a preschool Casa Montessori classroom consisting of two teachers and 15 other 3 to 5 year old children. Max attended preschool each morning for three to five hours per day. Following the Montessori method, work periods allowed students to select and terminate activities on their own (Standing, 1957). Activities included a variety of domains (e.g., functional skills, early literacy skills, and mathematics); some were designed to be independent work while other activities were completed in pairs or small groups. In addition to work sessions, students participated in scheduled activities including lunch, recess, physical education and music.

Measures

Informant functional behavioral assessment. The Parent Interview for Assessing Function – OCB **(**PIAF-OCB; Guertin, Vause, & Feldman, 2016; Appendix A) is an interview

specifically developed by this research team to elucidate hypothesized function(s) of OCBs. It consists of 36 open-ended questions and requires less than 20 minutes to complete. The interview addresses social positive (i.e., attention or tangible), social negative (escape), and automatic positive reinforcement. A separate set of questions for each possible function covers motivating operations, antecedents, and consequences of the OCB. This measure was modeled after questionnaires developed by Feldman and colleagues (2002) and a treatment package for trichotillomania (Miltenberger, 2001).

Descriptive functional behavioral assessment. Using an open-ended chart format, the therapist recorded antecedent, behavior, and consequent events associated with each possible occurrence of the OCB in the school (Cooper et al., 2007; Appendix B). The datasheet included recording the setting, stimuli, child's activities, level of engagement, and reactions of others immediately before and after the behavior. Data was collected across 13 days for the target behaviors by the first author, a second year MA student in Applied Behavior Analysis with six years clinical experience, for two to three hours (i.e., Max's complete day at school) each day.

Anecdotal reports of social validity. On a daily basis, the therapist recorded narrative data in open-ended case notes on target behaviors, related behaviors, and unsolicited parent and teacher comments about the intervention.

Target behaviors and measurement. Definitions and measurement of target behaviors are described in Table 4-1 (datasheet is appended in Appendix C). Max's teachers and mother identified two interfering behaviors in consultation with the therapist to target for treatment. The behaviors were measured using per-opportunity percentage data as the primary dependent variable. The first target behavior involved Max walking or running directly to his classroom window. From the window, he knocked on the window over ten times until his peers and

teachers stopped their activities and waved to him. If his mother attempted to redirect him from his routine, teachers reported Max remained distressed for up to 40 minutes (crying, yelling, and pushing past his mother), further disrupting peers and teachers in the classroom. An occurrence of the target behavior was scored if any steps of the window routine was performed upon entering the school with his mother.

Table 4-1

Operational Definitions of Opportunities, Behaviors, and Duration Data

Behavior	Data Collection Procedure	Definition
Morning routine	Per-opportunity percentage	*Opportunity:* Upon arrival to school with his mother; presence of children and teachers in the classroom. *Occurrence:* Engaging in any part of the chain of behaviors, including: repeatedly tapping, and waiting for attention from teachers or peers. Scored as '1' if any part of the chain occurs during an opportunity.
Work routines	Per-opportunity percentage	*Opportunity:* When a peer approaches Max during a work activity and either asks to join him or begins to touch his materials. The start of a new activity denotes a new opportunity. *Occurrence:* An objection, either physical (e.g., pushing peer away) or verbal (e.g., saying no, crying, whining, yelling) that occurs after an opportunity. Scored as '1' if any of the behaviors occur during an opportunity.
Peer Engagement	Duration	Duration starts when a peer sits at his activity, touches his materials, or he agrees for the peer to join in. Duration ends when activity described above stops, one of the children leaves the activity, or the activity is completed.

The second behavior was an inflexible and rigid performance of work tasks. When Max selected a work task, any peer who approached him resulted in a verbal or physical protest, followed by a period of distress (e.g., crying, yelling, and covering or grabbing his materials) for more than 30 minutes. As a result, Max did not engage in joint activities with peers who learned to avoid him over time. An occurrence of a protest was scored each time Max verbally or

physically protested when a peer approached him during an independent work activity. An additional goal was to increase the time Max spent in joint engagement in work activities with peers by teaching him to perform these skills during exposures. Duration of joint engagement was recorded as a secondary measure using the "Clocks" application on an iOS mobile device.

Interobserver agreement (IOA). A second, trained observer with undergraduate coursework in Applied Behavior Analysis collected per-opportunity percentage data for 48% and 42% of opportunities for the morning routine and work routines, respectively. IOA was calculated by dividing the daily occurrence of the observed behaviors for the lower reported number by the higher reported number of occurrences and multiplying by 100 (Cooper et al., 2007). Mean IOA was 97% (range: 50-100%) and 100% for occurrence of the target behaviors in the morning and work routines, respectively. Agreement for occurrence of morning routines (as described in Table 1) was 100% for 16 of 17 observations.

IOA for duration of social engagement was calculated on 36% of opportunities. Mean IOA was calculated by dividing the lower reported duration value by the higher duration value and multiplying by 100. The IOA was 97% (range: 82-100%) for duration of peer engagement.

Interrater agreement was also conducted on the functional behavioral assessment. A second observer, a second year MA student in Applied Behavior Analysis with four years of clinical experience and blind to the hypothesized functions of the therapist, analyzed the narrative ABC data and listened to the PIAF-OCB interview over the phone. Agreement between the therapist and secondary observer on functions of the behavior was 100%.

Research Design

The study followed a concurrent multiple baseline across behaviors design, treating the morning routine followed by rigid work routines (Cooper et al., 2007). Time series per-

opportunity occurrence data were collected for each of the behaviors by the therapist. Duration data for the time spent at Max's classroom window each morning and the amount of time spent engaging in work activities with peers were collected as a more sensitive dependent variable of Max's time spent engaging in target behaviors.

Procedures

All protocols and procedures received clearance from a University Research Ethics Board (Appendices D to H). The therapist was a second year MA student in Applied Behavior Analysis with six years of clinical experience in ABA. The student was supervised weekly for at least two hours including on-site observations. The supervising researcher had a Ph.D. in Clinical Psychology, Board Certified Behavior Analyst – Doctoral, and was a licensed therapy provider. The therapist was present in the classroom for 12 hr across four mornings per week for 10 weeks; in total, the therapist was present in the classroom for approximately 115 hr.

Baseline. In baseline, the therapist collected data on naturally occurring opportunities for both behaviors. The therapist also contrived scenarios for rigid task completion by asking a peer to approach Max, touch his materials, or ask to join in his activity. In the event Max objected, peers were instructed to follow his request for the peers to leave his activity.

Functional behavioral assessment and function-based intervention. During initial and baseline observations of the behavior, detailed narrative ABC data were collected for all possible contrived and natural occurrences of the target behaviors by the therapist. Approximately one week prior to treatment, the therapist completed a PIAF-OCB with Max's teacher who spent approximately 21 hours weekly in the classroom with him. The combination of narrative ABC data and interview responses were used to identify hypothesized functions of target behaviors.

According to combined assessment results, the hypothesized function of the morning window routine was social positive reinforcement in the form of attention from teachers and peers. For the morning routine, the intervention consisted of providing attention (e.g., praise) contingent on his direct entry to the school by the therapist, Max's teacher, and mother. An additional tangible competing reinforcer (i.e., small toy) was provided for refraining from engaging in the routine. To provide an alternative communicative response when he entered classroom, the therapist verbally prompted him to greet a peer whose name he frequently called while outside tapping on the window.

Based on narrative ABC data and PIAF-OCB results, work routines were hypothesized to be maintained by social negative reinforcement and automatic negative reinforcement, since peers left Max alone following a protest. The intervention used a differential reinforcement of alternative behavior procedure whereby Max (and his peer) received behavior-specific praise on a variable-interval 10-s schedule for engaging with peers on work tasks (Petscher, Rey, & Bailey, 2009). In order to reduce the probability of a protest, the therapist used verbal and gestural prompts to redirect Max to the task and promote commenting. The therapist also used light physical prompting to redirect him back to the activity if Max left the area.

Antecedent strategies. The researchers incorporated behavioral strategies to mitigate Max's levels of distress while treating the behaviors. First, a story guide or If/Then visual were developed to explain the contingency of receiving competing reinforcers for completing the modified ERP step and discussed with him prior to each exposure. Max was asked to select a behavioral strategy to be used for the exposure. For the morning routine, Max selected either singing or taking deep breaths and blowing on a pinwheel. A positive self-statement, "I can do

it!" was selected for work routines. The therapist had Max practice the strategy in advance of performing the exposure step.

Modified exposure and response prevention with reinforcement. Modified exposures were planned to disrupt and prevent engagement in the routines based on the guidelines of March and Mulle (1998). The modified exposure procedure aimed to reduce the levels of distress Max experienced with the antecedents of the OCBs. An exposure plan was plotted on a visual chart indicating antecedent strategies, graded exposure plans, and checkboxes for reinforcement (Vause et al., 2015; Appendix I). For the morning routine, Max participated in a gradually decreasing number of steps to the routine (e.g., walking to the window without tapping) until he walked directly into the school. Light physical response blocking was used to prevent Max from engaging in the targeted step of the routine in the preliminary graduated exposure trials. For work routines, he participated in a gradually increasing duration of play with peers from 10 seconds to the full length of time required to complete the activity according to Montessori method, similar to tolerance training procedures (Cipani, 2007). During these exposures, the therapist provided verbal and gestural prompts as needed to promote turn taking, commenting, and completion of the activity. Peers gradually took more turns touching and manipulating the items in the activity. Upon successful completion of an exposure, the therapist directed Max to reference the visual exposure plan and checked the appropriate box for completing the step. Competing reinforcers of small tangible items (e.g., toy cars) or high fives were delivered by the therapist for the morning and work routines following successful completion of the exposure.

Intervention fading. Following a minimum of six consecutive opportunities without Max engaging in the target behaviors, a fading procedure was used to transfer stimulus control and maintenance of the behavior to more natural conditions. The fading procedure removed the

visual guide and tangible reinforcers were switched to verbal praise from Max's mother for the morning routine. For work routines, praise was altered to fit the type of verbal attention provided to students in a Montessori classroom (e.g., "Are you proud of what you did?") as opposed to behavior-specific praise (e.g., "Great job working with your friends!").

Transfer to mediator. After a minimum of three successful trials of intervention fading, the therapist conducted behavioral skills training on the intervention with the mother and teacher. Max's mother and teacher were asked to (a) set up the exposure and explain the expectation if required, (b) use prompting to guide Max to complete the exposure, and (c) provide reinforcement. Prior to the maintenance procedure, Max's mother and teacher observed the therapist implement the intervention. The therapist reviewed the protocol with the parent and teacher and asked them to complete the maintenance procedures while observing from a distance. The therapist provided feedback and problem solving as necessary to fit the intervention to the needs of the mediator and maintain child performance. Feedback by the therapist was faded until the mediator performed at least three exposures without Max engaging in the target behaviors using the three components of the protocol.

Follow-up. Three weeks following the last teacher-led trial, the therapist conducted follow-up observations of Max's performance with the mediator implementing the procedure.

Treatment integrity. The observer who completed IOA on behavior measurement completed a treatment integrity checklist comprised of antecedent, prompting, and reinforcement strategies for each of the interventions for 44% and 62% of the treatment sessions of the morning and work routines prior to treatment fading, respectively (Appendices J and K). Average treatment integrity was 95% (range: 90-100%) for the morning routine behavior and 93% (range: 83-100%) for the rigid completion of tasks behavior. Treatment integrity was not collected for

mediator implementation because the treatment was faded close to natural conditions and the therapist did not want to create an evaluative environment with the mediators.

Results

The per-opportunity occurrence and duration results are depicted in Figure 4-1. While treatment was introduced for the morning routine, levels of protests to peers during work tasks remained the same in baseline, indicating experimental control. A functional relationship was therefore established between the introduction of Fb-CBT and reductions in the targeted OCBs.

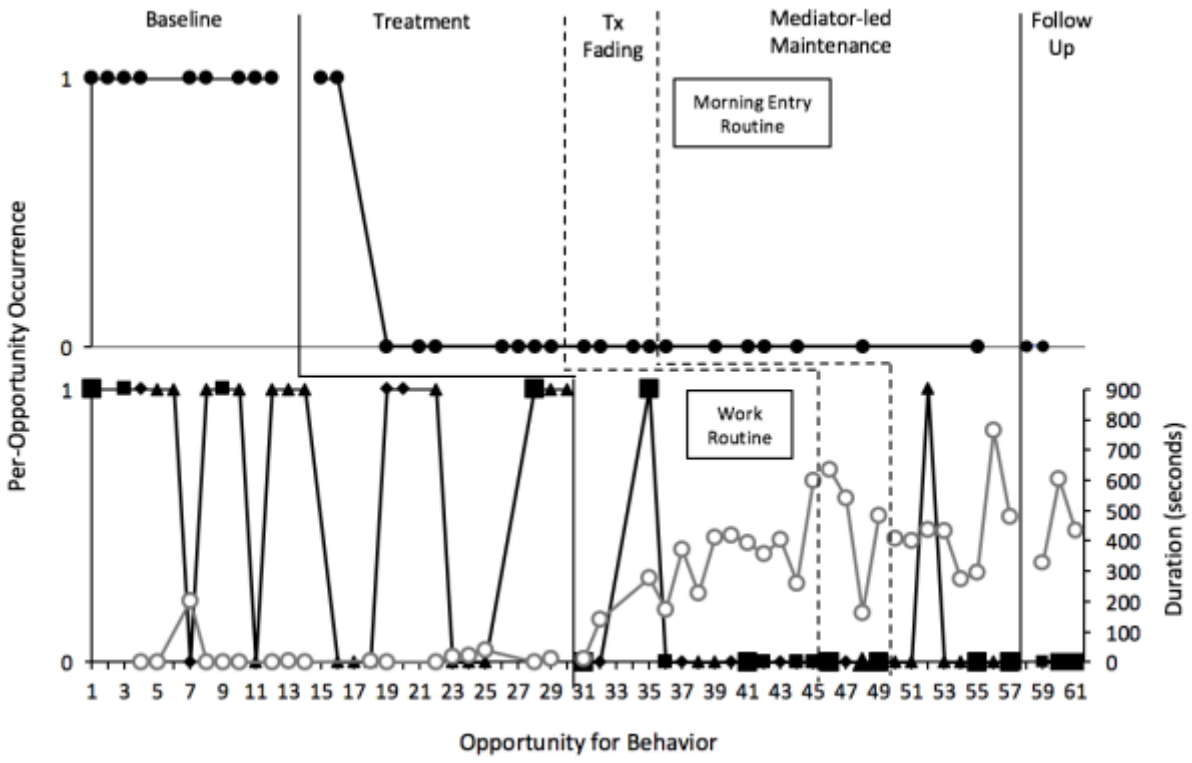

Figure 4-1. Per-opportunity percentage (black data points) of morning window-tapping routine and rigid completion of tasks alone. Grey open markers signify duration of time engaged with peers in work tasks (bottom panel). In the second panel, large squares represent tower building activities, small squares represent a geometric solid activity, diamonds represent wooden cylinder activities, and triangles are incidental or miscellaneous activities.

Per-opportunity percentage (black data points) of morning window-tapping routine and rigid completion of tasks alone. Grey markers signify duration of time spent at the window (top panel) and the duration of time engaged with peers in work tasks (bottom panel).

Morning Routine

For the morning routine, Max completed the routine in 100% of opportunities in baseline. Max decreased the duration spent at the window and the number of steps performed to zero levels in accordance with the gradual exposure plan in treatment sessions. The occurrence was maintained at zero levels throughout treatment fading and teacher-led maintenance across 1 month of data collection. Results were maintained at a three-week follow-up.

Protests to Peers in Work Routines

For the second targeted behavior, protests to peers occurred in 65% of opportunities on a variety of two-person work tasks. Duration data on time engaged with peers during work was collected on a sample of baseline behaviors. In some cases the observers had difficulties with starting the timers and the therapist had to provide instructions to peers for how to respond to Max in baseline (i.e., to approach, but then leave Max if he engaged in protest behaviors). In baseline, duration of peer engagement was 38 s or lower in all trials except one, when Max agreed to work with a peer for 200 s. Immediately upon introduction of treatment, protests to peers remained at zero levels except in one trial. In that trial, Max said "no" to a peer but complied with the task per the extinction protocol for the remainder of the activity. Duration increased in accordance with the gradual exposure plan. By the fourth trial, Max was completing the full duration of the activity based on Montessori expectations and therapist observations of normative peers. Protests remained at zero and duration of engagement maintained at similar levels (M = 455 s) during treatment fading. Duration of engagement remained similar (M = 436

s) in teacher-led maintenance. At a three-week follow-up, Max did not protest and had a mean of 454 s of engagement with peers during work across three trials.

Social Validity

Teachers noted the positive change in Max's routine-governed behaviors and levels of distress when asked to refrain from completing routines. Max was no longer engaging in long outbursts of yelling or crying when entering the school or working with peers without engaging in the routines. The teachers also reported excitement on two occasions when Max spontaneously worked with peers in the classroom without their intervention. The therapist also noted several collateral events while implementing the intervention for rigid work routines. Growing interest from both Max and his peers to work together was evident when peers would spontaneously join activities or ask the therapist when they could next work with Max. Completion of one activity also often progressed into another when children independently agreed to work on a second activity together. On one occasion, Max asked his teacher if he could continue working on an activity with peers after the break for recess. Finally, evidence of teacher skill generalization was demonstrated in gym class when Max was asked to share items with peers and refused. The therapist implemented the extinction procedure by asking the peers to remain for at least 10 seconds and the teachers began implementing it independently in the remainder of the gym class.

Teachers also indicated that the therapist could contrive more opportunities in the classroom to work with peers. The therapist initially was careful not to disrupt the classroom and maintain Montessori method, but adapted to this feedback and initiated more daily sessions.

Discussion

The combined function-based and modified ERP intervention was successful in reducing the occurrence of the repetitive morning and work routines by the participant. Morning routine

occurrence and duration was brought to zero levels. For work routines, the decrease in refusals to peers corresponded with increases in the duration spent engaged in work tasks with his peers. Reductions in both behaviors were maintained by natural mediators at a 3-week follow-up. These results extend the applicability of the Fb-CBT protocols to a child with ID and implementation in a preschool setting (Vause et al., 2014; Vause et al., 2015) and contribute to a growing body of literature about treatments for OCBs using either function-based (Chok & Harper, 2016; Rodriguez et al., 2012), ERP procedures (Chok & Koesler, 2014; Boyd et al., 2013) or a combination (Vause et al., 2014; Vause et al., 2015).

This study provides preliminary support for modifications to the Fb-CBT protocol for a child with mild ID. This treatment removed the psychoeducation phase designed to teach the child about OCBs and rate the levels of fear associated with refraining from each behavior. Cognitive strategies such as cognitive restructuring or challenging faulty assumptions were also removed. Components were removed due to Max's limited cognitive and verbal ability to participate in and/or benefit from them. The ERP procedure was modified because the therapist could not ensure Max was exposed to the thoughts evoking the OCBs. The treatment emphasized visual and verbal communication of the expectations and contingencies in advance of the exposure. Concrete behavioral strategies such as deep breathing, singing, and positive self-statements (i.e., "I can do it!") were used in the study. Max often selected positive self-statements prior to exposures and following a successful exposure he often said, "I did it!"

Limitations on Max's mother and teacher's time required on-site training to occur concurrently with treatment delivery. The therapist was able to provide the full intervention, fade resource-intensive treatment components (i.e., visuals, continuous reinforcement schedules) to

more natural conditions, and train mediators to perform maintenance procedures. Mediator-led maintenance appeared effective as gains were maintained at a 3-week follow-up.

Collateral observations suggest that Max engaged with peers and learned new activities. Interest grew from both Max and his peers to work together by the end of treatment. These potential benefits of the treatment support the points of Boyd et al. (2012) that engaging in OCBs could prevent the child from social and developmental opportunities if left untreated. The exposures for work routines involved teaching Max social skills to promote working with peers, allowing for social learning opportunities that were previously not occurring in the classroom.

Despite the promising results of the study, some limitations exist. The results of one participant limit the generalizability of the results to other children with ID. The design of the study included only two behaviors in the multiple baseline, limiting the number of replications and level of experimental control. The intervention also took considerable therapist time to implement in the school environment. In addition, the intervention was multicomponent and the effectiveness of each component within the treatment has yet to be explored individually through component analyses. At the mother's request, no treatment for OCBs occurred in the home. Following success with the protocol at school, however, Max's mother reported using reinforcement strategies to reduce OCBs including a sleeping routine and noted he was now sleeping in his bed consistently. Further replication of the adapted Fb-CBT protocol in schools and at home will explore the applicability of the protocol to young children with ID. The study also noted some meaningful social changes following treatment. Measuring baseline levels of several additional collateral events (e.g., frequency of approach from peers) will investigate if a functional relationship exists between the intervention and changes in these events.

Conclusion

The adapted Fb-CBT protocol was effective at reducing OCBs and increasing social engagement in a preschooler with mild ID. Early intervention and prevention of future OCBs could help to mitigate negative developmental consequences of OCBs. Ongoing research is required to evaluate treatment options for children with ID, or comorbid ASD and ID, populations in which these behaviors are frequently occurring. Studies of both home and school settings are crucial in order to target OCBs in the environment in which they naturally occur.

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Chapter 5: General Discussion and Conclusions

Discussion

The primary focus of this project was to adapt and evaluate an existing function-based cognitive behavioral therapy treatment package for a young child with ASD. The adapted treatment protocol, focusing primarily on antecedent strategies, differential reinforcement of alternative behaviors, and exposure and response prevention was successful at eliminating obsessive compulsive behaviors (OCBs) in a four-year-old boy with mild intellectual disability. In addition, the duration of the boy's joint engagement with peers increased in conjunction with anecdotal reports of a mutual interest to continue working together. Given the detrimental effects of OCBs on developmental outcomes (Boyd et al., 2012), the adaptation of treatment packages to reduce and prevent OCBs can be a crucial step to mitigating these effects.

The functional behavioral assessment was successfully adapted to the preschool environment. Indirect interviews and direct observation by the therapist using narrative antecedent, behavior, consequence (ABC) data worked well within the context of the school environment, requiring a total of less than 30 minutes with Max's teachers outside of the classroom. Socially mediated functions were identified as hypothesized functions in each of the OCBs in addition to automatic negative reinforcement. The evaluation of the validity this functional behavioral assessment for OCBs by comparing the outcomes to experimental functional analyses is required. However, given the acknowledged difficulty in assessing the presence of distress as a motivating variable for OCBs during functional analyses, researchers suggest the use of indirect and direct assessment techniques to assess automatic negative reinforcement (Miltenberger, 2005). Future research is required to establish valid functional behavioral assessment procedures that can fit a variety of treatment contexts (e.g., group-based,

school-based, individual, or family treatments) and are sensitive to evaluating internal states of distress.

This applied study also speaks to the utility of a function-based perspective for assessing the presentation of OCBs in children with developmental disabilities beyond the relief of anxiety. Given the OCBs presented by Max were hypothesized to be maintained by both a socially mediated consequence and automatic negative reinforcement, treatment was designed to target both functions. Modified exposure and response prevention (ERP) aimed to decrease Max's level of distress in the presence of the associated antecedents (e.g., peers touching his work materials). The addition of a differential reinforcement of alternative behaviors provided a reinforcer for Max working with his peers, while aiming to prevent and redirect Max to engage with his peers if he attempted to engage in the OCB. Further research into the active components of the multicomponent intervention will help to understand the mechanisms of behavior change.

The acknowledgment of functions beyond anxiety relief or automatic negative reinforcement presents some additional questions for researchers attempting to parse OCBs into either ASD or OCD diagnostic categories. Rather than a dichotomous variable of automatic positive or automatic negative reinforcement, additional socially-mediated functions and combinations of multiple functions are discussed in the literature (Vause et al., 2015). This complication emphasizes the complexity of treating symptoms with topographical overlap; careful functional behavioral assessments will provide the clinician with more complete information about the underlying causes of the behavior and corresponding treatment options. Flexibility in treatment modality will allow the clinician to use CBT procedures (e.g., cognitive restructuring) when there is a presenting thought or obsession associated with the OCB and additional function-based interventions to treat other functions beyond anxiety relief. A

multimodal treatment package drawing on CBT and ABA would therefore be suitably robust to treat behaviors that topographically resemble OCD symptoms but may be occurring for a variety or combination of reasons. With ongoing study of the functions of OCBs with valid and reliable measures, further insight into the frequency of functions of these behaviors should help provide further guidelines for understanding the relationship between ASD and OCD symptoms.

Finally, this thesis offers two contributions to a small body of literature considering the role of distress in function-based treatments of obsessive compulsive behaviors in developmental disabilities (Vause et al., 2014; Vause et al., 2015; Chok & Harper, 2016; Chok & Koesler, 2014). Few studies in applied behavior analysis discuss the possible role distress can play as a motivating operation in automatic negative reinforcement contingencies (Miltenberger, 2005). By incorporating this perspective, the utility and mechanism by which ERP and other cognitive behavioral therapy components reduce compulsive behaviors can be understood within a function-based framework (Miltenberger, 2005). The incorporation of ABA and CBT in a treatment package for OCBs allows the clinician to treat multiple OCBs with components tailored to the specific functions of the individual behaviors, irrespective of whether or not the behaviors meet the criteria for comorbid OCD. Ongoing exploration and collaboration between CBT and ABA perspectives is critical to determining broader efficacy of these treatments.

Conclusion

Functional perspectives provide a comprehensive and useful framework from which to assess and treat OCBs in children with developmental disabilities. Accounting for all possible functions and combinations thereof during assessment provides additional insight for approaching overlapping symptoms between ASD and OCD. Based on this framework, an adapted version of Fb-CBT for a four-year-old boy with mild ID and OCBs was successful at

eliminating two OCBs in the preschool environment and increasing social engagement. Preliminary support for this treatment protocol suggests ongoing study of its applicability for other preschool-aged children with developmental disabilities and OCBs.

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Vause, T., Hoekstra, S., & Feldman, M. (2014). Evaluation of individual function-based cognitive-behavioral therapy for obsessive-compulsive behavior in children with autism spectrum disorder. *Journal on Developmental Disabilities, 20*(3), 30-41.

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Appendices

Appendix A

Parent Interview for Assessing Function-OCB
PIAF-OCB

Emily Guertin, Tricia Vause, & Maurice Feldman

Note: Use knowledge of the OCB and descriptive (ABC) data from previous meetings to tailor the interview.
"I am going to ask you some specific questions that will help us to understand if the compulsion occurs because of any other factors beyond relieving anxiety. This will help us to create an individualized treatment plan for [child's name]. Some questions likely will not apply to [child's name]'s compulsions, and that is okay. Try to think about the last few weeks when you most recently saw the compulsion."

Function: Social Positive Reinforcement in the form of Attention

Motivating Operations
Does [he/she] get frequent opportunities to interact with peers and family members?
Do you ever find that [child's name]'s social skills interfere with their ability to get attention from friends or family?

Antecedents
Who tends to be present when the compulsion occurs (e.g., family, friends, peers, teachers, etc.)?
Optional: Does the compulsion occur in the presence of some people but not others?
Does the compulsion occur when someone diverts their attention to something or someone else?
Does your child look at you prior to doing the compulsion?

Consequences
How do you or other family members react to the compulsion most frequently?
Are there any other reactions you have towards the compulsion that are less frequent?
From before to after the compulsion, do you change how you pay attention to [child's name]?

Function: Social Positive Reinforcement in the form of Tangibles

Motivating Operations
Does the compulsion occur when preferred items are removed or not available for a period

of time?

Antecedents
Does someone else have a preferred item prior to the compulsion (but not [child's name]?
Can [child's name] see a preferred item but not have it prior to the compulsion?
Does the compulsion occur when [child's name] is told he can no longer do an activity he likes?

Consequences
Does the child ever get an item or activity (e.g., iPad, toys, snack, going for a walk) right after they engage in the compulsion?
Optional: Does the compulsion stop once a certain item or activity is given to the child?

Function: Social Negative Reinforcement (i.e., Escape/Avoidance)

Motivating Operations
Is [child's name] given opportunities for breaks from difficult tasks?
Does [child's name]'s day frequently consist of many difficult tasks or tasks they don't want to do?

Antecedents
Does the compulsion occur when [child's name] at certain times of day?
Optional: If so, what time periods specifically? What do they have to do at those times?
Does the compulsion occur during times when the child would have to do something they don't want to do (e.g., homework, chores, transitions)?
Optional: Does the compulsion occur after someone approaches the child socially?

Consequences
Does [child's name] no longer have to do something after doing the compulsion *(provide a relevant example to the OCB)*?
Does the compulsion result in a break or modified expectations to the preceding task?
Optional: Is [child's name] left alone after the compulsion occurs?
Does he/she do the compulsion in order to avoid or end contact with other people?
Optional: Does the compulsion delay the introduction of an activity (e.g., bedtime, dinner, going to school, etc.)?

Function: Automatic Positive or Negative Reinforcement

Motivating Operations
Optional: Does [child's name] frequently have limited things to do throughout their day?

Antecedents

Does the compulsion occur even when the child appears to be by himself?
Does the compulsion occur when certain events in the environment (e.g., noise, crowds, light, etc.)?
Does the compulsion occur when there are limited things for [child's name] to do?
Does the child seem distressed before engaging in the compulsion?

Consequences
Does the compulsion seem to provide enjoyment, security, or soothing to [child's name] even when no one reacts to the compulsion?
Does the compulsion decrease once certain events in the environment (e.g., noise, crowds, light) are removed?

Setting Events:
Does the compulsion occur more frequently when your child is feeling sick or unwell?

Guide for Determining Hypothesized Function

With your written interview results, check the boxes of the events or conditions that apply. The strongest evidence is when there are both antecedents and consequences that indicate a function. Weaker evidence would be if there is only a consequence that indicates the function.

Social Positive Reinforcement in the form of Attention

Attention is likely to be a function of a compulsion when the child receives a particular type of attention after performing the compulsion. When attention is provided for performing the compulsion, look for antecedents that would indicate that the child is looking for attention.

Antecedents	Consequences
◊ The compulsion occurs when the parent turns attention to another person	◊ Someone ends diverted attention and pays attention to the child
◊ The compulsion occurs when the parent is not responding to the child	◊ Someone approaches and engages with the child
◊ The child looks for another individual (e.g., eye contact, proximity, verbally) before performing the compulsion	◊ The child receives physical contact
◊ The child has lower quality attention prior to engaging in the compulsion compared to following the compulsion	◊ The quality of attention changes following the child engaging in the compulsion (e.g., attention looks or sounds different, shift to one-on-one attention, etc.)
Are there antecedents for attention? Y / N	Are there consequences for attention? Y / N

Social Positive Reinforcement in the form of Tangibles

Access to tangible items could be a function of a compulsion when the child receives an item from a parent or other person after they perform the compulsion. When the child does

not have access to the item prior to engaging in the compulsion, look for occasions when they gain access to the item.

Antecedents	Consequences
◊ The compulsion occurs when a someone removes a preferred item from the child ◊ The compulsion occurs when someone else is using a preferred item ◊ The child asks or orients towards a preferred item (e.g., looks at item, asks for it) before performing the compulsion ◊ The child has access to items that are of lower preference than the one they tend to receive following the compulsion	◊ Someone provides the item to the child following the compulsion ◊ The quality of the preferred item increases following the compulsion
Are there antecedents for access to tangibles? Y / N	Are there consequences for access to tangibles? Y / N

Social Negative Reinforcement (i.e., Escape/Avoidance)

Escape is likely to be the function of a compulsion when a child is asked to perform an activity they do not want to do, and the demand is removed or delayed by the child performing the compulsion. The tasks a child may not want to do could be easier tasks (e.g., getting dressed) or difficult tasks (e.g., performing a math test, going to the doctor). The result can be a delay in presenting the activity (e.g., getting dressed in 20 minutes as opposed to immediately), a break, or cancellation of the activity altogether (e.g., cancelling the doctor appointment).

Antecedents	Consequences
◊ The compulsion occurs when someone asks the child to perform an activity they do not want to do ◊ The compulsion occurs at a time of day when an activity occurs that they do not want to do ◊ The child asks or shows some signs of requesting not to do the activity prior to engaging in the compulsion ◊ The child is engaging in an activity they do not want to do when they start to perform the compulsion	◊ The child receives a break from the activity they are performing following the compulsion ◊ The child is delayed in needing to perform the activity following the compulsion ◊ The activity is cancelled or ended following the compulsion ◊ Social contact is ended or reduced following the compulsion
Are there antecedents for escape or avoidance? Y / N	Are there consequences for escape or avoidance? Y / N

Automatic Positive or Negative Reinforcement

Automatic reinforcement is likely to occur when the behavior occurs reliably without the intervention of others. Behaviors are reinforced because the behavior itself produces a positive internal state (e.g., enjoyment) or removes a negative internal state (e.g., relieving tension or muffling a sound).

Antecedents

- ◊ The compulsion can occur when no one is around to respond to the behavior
- ◊ The compulsion occurs when the child may not have any other activities to do
- ◊ The child looks appears distressed prior to engaging in the behavior
- ◊ There are environmental events that are disruptive to the individual prior to engaging in the behavior (e.g., loud noises, bright lights, crowds)

Are there antecedents for automatic positive reinforcement? Y / N

Are there antecedents for automatic negative reinforcement? Y / N

Consequences

- ◊ The behavior occurs in the absence of reaction from others
- ◊ The child appears to enjoy the behavior (e.g., smiling or laughing)
- ◊ The child shows fewer signs of distress following the behavior (e.g., no longer crying, no longer frowning or grimacing)

Are there consequences for automatic positive reinforcement? Y / N

Are there consequences for automatic negative reinforcement? Y / N

Appendix B

ABC Narrative Recording Sheet

Child's initials: _____ Target OCB: _____

Initials, Date, & Time	**Antecedents** (specify location, events, stimuli present, people, etc.)	**Behavior**	**Consequences** (specify events, reactions, items delivered, breaks given, etc.)
Sample Entry 1	Arrived in vehicle with parent. Put on coat and boots, therapist joined them and walked behind. Not holding hands but close together. Walked straight to the window.	Tapped on the window for ~10 seconds. Asked for a specific student. Kept tapping until teacher waved.	Parent asked Max to transition into the school. Max was compliant with the request. (Note: during routine, peers and teachers waved at him).
Sample Entry 2	Completed and tidied up a tower building activity. Teacher suggested to peer that the peer and Max work together on a cylinder activity. Therapist was seated nearby.	Refusal to work with peers. Cry or whine and verbal approximation of "I don't want to."	The demand was not followed through, peer put the cylinders activity away. Max went to another part of the room and took out different work.
Sample Entry 3	Set up a geometry activity lesson with the teacher. Therapist was nearby. Max and the teacher started the lesson. A peer approached the mat and began to participate by touching the materials of the lesson.	Verbal protest and Max covered the lesson materials with his body.	Continued demands for one more peer's turn, then terminated the lesson. Max started tidying up and then started playing with lesson materials. Teacher and peers left the lesson.

Appendix C

Data Collection Sheet

Date: _____ **Initials:** _____ **Time**: _____ **Phase**: BL / T1 / T2 / T3 / F

Morning and Afternoon Window Routine

Question	**Yes**	**No**
1. Upon arrival, were there children and teachers in the classroom when Max approached the school?		
2. Upon arrival, did Max perform the full window tapping routine? See Q3 for full description.		
3. Of the window tapping routine, which of the following steps were performed: • Max approached the window • Max tapped on the window • Max waited or continued tapping until at least one peer waved at him • Max waited until specific peer waved at him		
4. How long was M. at the window (i.e., from the time he stopped at the window to the time he started to walk away from the window)?	Duration (sec):	

1. Upon leaving school, were there children and teachers in the classroom? *This will only be on Mondays and Thursdays.*		
2. Upon leaving school, did M. perform the full window tapping routine? See Q3 for full description.		
3. Of the window tapping routine, which of the following steps were performed: • Max approached the window • Max tapped on the window • Max waited or continued tapping until at least one peer waved at him • Max waited until specific peer waved at him		
4. How long was Max at the window (i.e., from the time he stopped at the window to the time he started to walk away from the window)?	Duration (sec):	

Helpful reminders:

- As you see Max arrive and are going outside to leave, check where the other peer is in the classroom so you may find him more easily once outside
- Unlock your phone as you go outside

Refusal to Play or Work with Peers

An *opportunity* is a case when a peer approaches Max during a work (i.e., Max's choice) or assigned (i.e., teacher instruction provided) activity and either asks to join him or starts touching his materials.

A *refusal behavior* is an objection, either physical (e.g., pushing peer away) or verbal (e.g., saying no, crying, whining) that occurs after the opportunity.

Tally the frequency of opportunities and occurrences of refusal behaviors and the duration of time Max tolerates the presence and/or interaction with the peer before the refusal behavior.

	Opportunities	**Behavior Occurred**	**Duration (seconds)**	
Refusal Behavior			1:	5:
			2:	6:
			3:	7:
			4:	8:

Specify for each instance whether or not it was (a) asking to join or (b) interrupting an ongoing task. Specify if the activity was already started when the peer approached, activity details, etc.:

Appendix D

REB Clearance

Brock University
Research Ethics Office
Tel: 905-688-5550 ext. 3035
Email: reb@brocku.ca

Social Science Research Ethics Board

Certificate of Ethics Clearance for Human Participant Research

DATE: 9/13/2016

PRINCIPAL INVESTIGATOR: VAUSE, Tricia - Child and Youth Studies

FILE: 16-010 - VAUSE

TYPE: Masters Thesis/Project STUDENT: Emily Guertin
SUPERVISOR: Tricia Vause

TITLE: Treating Obsessive-Compulsive Behaviour in Children 3 to 6 years of Age with High Functioning ASD: Cognitive-Behavioral Treatment with Function-Based Intervention

ETHICS CLEARANCE GRANTED

Type of Clearance: NEW Expiry Date: 9/29/2017

The Brock University Social Science Research Ethics Board has reviewed the above named research proposal and considers the procedures, as described by the applicant, to conform to the University's ethical standards and the Tri-Council Policy Statement. Clearance granted from 9/13/2016 to 9/29/2017.

The Tri-Council Policy Statement requires that ongoing research be monitored by, at a minimum, an annual report. Should your project extend beyond the expiry date, you are required to submit a Renewal form before 9/29/2017. Continued clearance is contingent on timely submission of reports.

To comply with the Tri-Council Policy Statement, you must also submit a final report upon completion of your project. All report forms can be found on the Research Ethics web page at http://www.brocku.ca/research/policies-and-forms/research-forms.

In addition, throughout your research, you must report promptly to the REB:

a) Changes increasing the risk to the participant(s) and/or affecting significantly the conduct of the study;
b) All adverse and/or unanticipated experiences or events that may have real or potential unfavourable implications for participants;
c) New information that may adversely affect the safety of the participants or the conduct of the study;
d) Any changes in your source of funding or new funding to a previously unfunded project.

We wish you success with your research.

Approved: J. Frijters

Jan Frijters, Chair
Social Science Research Ethics Board

Note: Brock University is accountable for the research carried out in its own jurisdiction or under its auspices and may refuse certain research even though the REB has found it ethically acceptable.

If research participants are in the care of a health facility, at a school, or other institution or community organization, it is the responsibility of the Principal Investigator to ensure that the ethical guidelines and clearance of those facilities or institutions are obtained and filed with the REB prior to the initiation of research at that site.

Appendix E

REB Modification Clearance

Brock University
Research Ethics Office
Tel: 905-688-5550 ext. 3035
Email: reb@brocku.ca

Social Science Research Ethics Board

Certificate of Ethics Clearance for Human Participant Research

DATE: June 9, 2017

PRINCIPAL INVESTIGATOR: VAUSE, Tricia - Child and Youth Studies

FILE: 16-010 - VAUSE

TYPE: Masters Thesis/Project STUDENT: Emily Guertin
SUPERVISOR: Tricia Vause

TITLE: Treating Obsessive-Compulsive Behaviour in Children 3 to 6 years of Age with High Functioning ASD: Cognitive-Behavioral Treatment with Function-Based Intervention

ETHICS CLEARANCE GRANTED

Type of Clearance: MODIFICATION Expiry Date: 9/29/2017

The Brock University Social Sciences Research Ethics Board has reviewed the above named research proposal and considers the procedures, as described by the applicant, to conform to the University's ethical standards and the Tri-Council Policy Statement.

Modification: Addition of Vineland Adaptive Behavior Scales – Second Edition.

The Tri-Council Policy Statement requires that ongoing research be monitored by, at a minimum, an annual report. Should your project extend beyond the expiry date, you are required to submit a Renewal form before **9/29/2017**. Continued clearance is contingent on timely submission of reports.

To comply with the Tri-Council Policy Statement, you must also submit a final report upon completion of your project. All report forms can be found on the Research Ethics web page at http://www.brocku.ca/research/policies-and-forms/research-forms.

In addition, throughout your research, you must report promptly to the REB:

a) Changes increasing the risk to the participant(s) and/or affecting significantly the conduct of the study;
b) All adverse and/or unanticipated experiences or events that may have real or potential unfavourable implications for participants;
c) New information that may adversely affect the safety of the participants or the conduct of the study;
d) Any changes in your source of funding or new funding to a previously unfunded project.

We wish you success with your research.

Approved: 

Ann-Marie DiBiase, Chair
Social Science Research Ethics Board

Note: Brock University is accountable for the research carried out in its own jurisdiction or under its auspices and may refuse certain research even though the REB has found it ethically acceptable.

If research participants are in the care of a health facility, at a school, or other institution or community organization, it is the responsibility of the Principal Investigator to ensure that the ethical guidelines and clearance of those facilities or institutions are obtained and filed with the REB prior to the initiation of research at that site.

Appendix F

Project Description and Consent to Participation Form: Principal

Research Project Title: Treating Obsessive Compulsive Behavior in Children 3 to 6 years of Age with Developmental Disability: Cognitive-behavioral treatment with Function-based Intervention
Principal Investigator: Dr. Tricia Vause, Brock University
tvause@brocku.ca, (905) 688-5550 ext. 3559
Student Investigator: Emily Guertin, Brock University
emily.guertin@brocku.ca, (289) 683-4044

In Partnership with

This description, a copy of which will be left with you for your records and reference, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

Purpose of Research:

For children with Developmental Disability who also have obsessive-compulsive behaviors (OCBs) that cause interference, we are interested in understanding more about what types of treatment techniques are helpful in reducing OCBs. We are interested in testing out a combination of behavioral and cognitive-behavioral assessment and treatment methods that have been effective in treating anxiety and behavioral issues in child populations. Each child in the study will be provided with an individualized treatment program that is modified to take into account his or her unique profile/characteristics, and involves at least one teacher throughout the process. The purpose of this study is to evaluate whether a combined cognitive-behavioral and behavior analytic treatment package is useful in reducing OCBs to manageable levels in very young children, and, in turn, improving both the child and caregivers' quality of life. We are also interested in learning about the skills teachers learn while participating in the treatment of participating children.

Description of Research:

The research project consists of several phases: assessment and observation, baseline, treatment with teacher training, and follow-up.

In the assessment and observation phase, members of the research team will come to the school in order to ask you and participating staff members about the OCBs of concern to them. The research staff will also collect information about how the behavior looks, how frequently it occurs, and the desired levels of the behavior when treatment ends. This will consist of two to three visits to the school to meet with a staff member and observe the child at school in the situations when OCBs occur. Any diagnostic assessments will be for research purposes only and will not constitute clinical diagnoses or reports.

In baseline, the research staff and teacher will collect information on the OCBs before the intervention. This phase will be several weeks, with approximately three to five observations of the research staff. The research staff will also observe how staff typically interact with the participating child during the OCBs.

In treatment, the research staff will work with the teachers to train them on the intervention for OCBs. The research staff will also work with the participating child directly to

model the treatment for the teacher. The training will include information about OCBs in children, individualized intervention planning, exposure and response prevention, reinforcement in accordance with Montessori practices, and relapse prevention. Treatment will take approximately six to eight weeks, with visits from the research staff one to three times per week to observe, conduct assessments, complete staff training, and work directly with the child.

A follow-up period will occur one to three months following the end of the treatment phase. The research staff and and teacher will complete one week of data collection about the OCBs in treatment. This would consist of one to three visits from the research staff and the teacher would complete 5 brief daily questionnaires.

The majority of treatment and research components discussed above will be delivered by the primary student investigator (Emily Guertin), a second-year MA student in Applied Behavior Analysis at Brock University. She is trained and supervised on a weekly, ongoing basis by the primary investigator (Dr. Tricia Vause), who has a Ph.D. in Clinical Psychology and has the Board Certified Behavior Analyst – Doctoral level qualification.

In addition, an undergraduate-level assistant therapist will help with the administration of regular visits and data collection and analysis. Another graduate student research assistant will aid in the assessment process to evaluate the reliability of the assessment measures. This student is trained and supervised on the measures by the primary investigator.

Potential Harms:

Generally, the procedures used in this study present no risks to the participants beyond what they encounter in everyday activities. When certain procedures are introduced, it is possible that there may a short-term increase in worry or stress in the participating child. However, in the long term, it has been shown that exposure to these procedures has led to a reduction in symptoms of children.

Potential Benefits:

Participating staff may benefit from participation by receiving training on how to conduct exposures for OCBs in the school environment.

Cost:

There is no payment or cost for participating in this study.

Confidentiality:

The results of the assessments and observations described above will remain confidential and stored in a locked office at Brock University. Any presentations, reports, or publications about the project will not contain any identifying information regarding the participants or school. The information will be kept indefinitely, and will only be used for educational purposes.

Given that the study occurs in a school environment with multiple staff and students present on site, it is possible that other members of the school will be aware of staff and student participation in the study should they choose to participate.

Exceptions to this confidentiality include any situation where a child is observed to be at-risk for abuse or neglect; we have a legal duty to file a report under Section 13 of the Child, Family, and Community Service Act. In any situation where a child is observed to put him or herself at risk, we will follow guidelines outlined by the College of Psychologists of Ontario.

Participation:

Participation is voluntary. Moreover, even after you give consent, you can stop any time and for any reason by simply calling the principal investigator listed at the end of the consent

form. If you would like to seek other alternatives beyond participation these research studies, please contact Dr. Vause for a referral to other services in your region.

Consent:

Signing the following page of this *Project Description and Consent Form* indicates that you have understood to your satisfaction the information regarding participation in the research project and agree for your school to participate. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and/or refrain from answering any questions you prefer to omit, without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation. This study has received ethics clearance through REB file # 16-010. The Research Ethics Officer can be contacted at mailto: reb@brocku.ca or (905) 688-5550 ext. 3035, and can provide responses to questions about the research participant's rights.

I, _____ hereby consent for the research project to take place at
(Principal, please print your name)
---------- with consenting teachers and student participants.
By giving consent I allow the research project staff, pending consent from teachers and the student's parents to:

- Observe the participating child in the school environment (e.g., class time, recess, snacks, and transitions to and from school).
- Work with a teacher in the school environment for one to three hours per week for approximately 12 weeks to develop and implement a treatment for the participating child.
- Implement intervention procedures including individualized behavioral treatment and exposure and response prevention in the participating child's school environment.
- Include the results in publications, reports, and talks, so that others may learn from this project.

Name of Principal/Director	**Signature**
Name of Researcher/Delegate	**Signature**

Date: _____

Appendix G

Project Description and Consent to Participation Form: Teacher

Research Project Title: Treating Obsessive Compulsive Behavior in Children 3 to 6 years of Age with Developmental Disability: Cognitive-behavioral treatment with Function-based Intervention
Principal Investigator: Dr. Tricia Vause, Brock University
tvause@brocku.ca, (905) 688-5550 ext. 3559
Student Investigator: Emily Guertin, Brock University
emily.guertin@brocku.ca, (289) 683-4044

In Partnership with

Purpose of Research:

For children with Developmental Disability who also have obsessive-compulsive behaviors (OCBs) that cause interference, we are interested in understanding more about what types of treatment techniques are helpful in reducing OCBs. We are interested in testing out a combination of behavioral and cognitive-behavioral assessment and treatment methods that have been effective in treating anxiety and behavioral issues in child populations. Each child in the study will be provided with an individualized treatment program that is modified to take into account his or her unique profile/characteristics, and involves at least one teacher throughout the process. The purpose of this study is to evaluate whether a combined cognitive-behavioral and behavior analytic treatment package is useful in reducing OCBs to manageable levels in very young children, and, in turn, improving both the child and caregivers' quality of life. We are also interested in learning about the skills teachers learn while participating in the treatment of participating children.

Description of Research:

The research project consists of several phases: assessment and observation, baseline, treatment with teacher training, and follow-up.

In the assessment and observation phase, members of the research team will come to the school in order to ask you and participating staff members about the OCBs of concern to them. The research staff will also collect information about how the behavior looks, how frequently it occurs, and the desired levels of the behavior when treatment ends. This will consist of two to three visits to the school to meet with a staff member and observe the child at school in the situations when OCBs occur. Any diagnostic assessments will be for research purposes only and will not constitute clinical diagnoses or reports.

In baseline, the research staff and teacher will collect information on the OCBs before the intervention. This phase will be several weeks, with approximately three to five observations of the research staff. The research staff will also observe how staff typically interact with the participating child during the OCBs.

In treatment, the research staff will work with the teachers to train them on the intervention for OCBs. The research staff will also work with the participating child directly to model the treatment for the teacher. The training will include information about OCBs in children, individualized intervention planning, exposure and response prevention, reinforcement in accordance with Montessori practices, and relapse prevention. Treatment will take

approximately six to eight weeks, with visits from the research staff one to three times per week to observe, conduct assessments, complete staff training, and work directly with the child.

A follow-up period will occur one to three months following the end of the treatment phase. The research staff and and teacher will complete one week of data collection about the OCBs in treatment. This would consist of one to three visits from the research staff and the teacher would complete 5 brief daily questionnaires.

The majority of treatment and research components discussed above will be delivered by the primary student investigator (Emily Guertin), a second-year MA student in Applied Behavior Analysis at Brock University. She is trained and supervised on a weekly, ongoing basis by the primary investigator (Dr. Tricia Vause), who has a Ph.D. in Clinical Psychology and has the Board Certified Behavior Analyst – Doctoral level qualification.

In addition, an undergraduate-level assistant therapist will help with the administration of regular visits and data collection and analysis. Another graduate student research assistant will aid in the assessment process to evaluate the reliability of the assessment measures. This student is trained and supervised on the measures by the primary investigator.

Potential Harms:

Generally, the procedures used in this study present no risks to the participants beyond what they encounter in everyday activities. When certain procedures are introduced, it is possible that there may a short-term increase in worry or stress in the participating child. However, in the long term, it has been shown that exposure to these procedures has led to a reduction in symptoms of children.

Potential Benefits:

Participating staff may benefit from participation by receiving training on how to design and conduct individualized interventions and exposures for OCBs in the school environment.

Will I receive the results of the study?

If you wish to have a written description of the results, please check YES in the appropriate box at the end of this form and we will send you a summary of the purpose of the study, general findings, as well as relevant information concerning your child including techniques or strategies that worked well for your child within 3 months after the completion of the study.

Cost:

There is no payment or cost for participating in this study.

Confidentiality:

The results of the assessments and observations described above will remain confidential and stored in a locked office at Brock University. Any presentations, reports, or publications about the project will not contain any identifying information regarding the participants or school. The information will be kept indefinitely, and will only be used for educational purposes.

Given that the study occurs in a school environment with multiple staff and students present on site, it is possible that other members of the school will be aware of your participation in the study.

Exceptions to this confidentiality include any situation where a child is observed to be at-risk for abuse or neglect; we have a legal duty to file a report under Section 13 of the Child, Family, and Community Service Act. In any situation where a child is observed to put him or herself at risk, we will follow guidelines outlined by the College of Psychologists of Ontario.

Data Collection and Confidentiality:

As part of the study, you will be asked to complete a short daily checklist of the child participant's behavior. This information must be kept confidential and shared only with members of the research team. The checklist should be kept in the enclosed folder in a secure location cannot be shared with other teachers, parents, or students (with the exception of participating child's parents). The data collected is for research purposes only and is not to be used in classroom assessments or for grading purposes.

Participation:

Participation must be voluntary. In consultation with the director of the school, if you choose not to participate, your employment will not be affected. Moreover, even after you give consent, you can stop any time and for any reason by simply calling the principal investigator listed at the end of the consent form. Should you choose to withdraw consent, your data will be stripped of all identifiers and be retained for research purposes. If you would like to seek other alternatives beyond participation these research studies, please contact Dr. Vause for a referral to other services in your region.

Consent:

Signing the following page of this *Project Description and Consent Form* indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and/or refrain from answering any questions you prefer to omit, without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation. This study has received ethics clearance through REB file # 16-010. The Research Ethics Officer can be contacted at mailto: reb@brocku.ca or (905) 688-5550 ext. 3035, and can provide responses to questions about the research participant's rights.

I, _____ hereby consent to my participation in completing direct and
(Teacher, please print name)
indirect assessments.

By giving consent I allow the research project staff to:

- Work with me to complete direct and indirect assessments and questionnaires about the participating child's OCBs before and after the treatment.
- Work with me in the school environment for one to three hours per week for approximately 6 weeks to train me, develop and implement a treatment for the participating child.
- Collect information about the skills I have for treating OCBs before, during, and after the treatment is implemented.
- Obtain personal information, including: name, employment title, and level of education
- Include the results in publications, reports, and talks, so that others may learn from this project.

Please circle YES or NO for the following items:

YES NO I would like to receive the results of this study.

YES NO The researchers may contact me directly for possible future related studies.

_____	_____
Name of Teacher	**Signature**
_____	_____
Name of Researcher/Delegate	**Signature**

_____
Date

If you wish to be contacted by the researchers in regard to possible participation in future research studies, please provide your contact information below.

_____	_____	_____
Name	**Telephone Number**	**Email Address**

The person who may be contacted about the research is:

Principal Investigator: Dr. Tricia Vause, Brock University
tvause@brocku.ca, (905) 688-5550 ext. 3559

Appendix H

Project Description and Consent to Participation Form: Parent

Research Project Title: Treating Obsessive Compulsive Behavior in Children 3 to 6 years of Age with Developmental Disability: Cognitive-behavioral treatment with Function-based Intervention
Principal Investigator: Dr. Tricia Vause, Brock University
tvause@brocku.ca, (905) 688-5550 ext. 3559
Student Investigator: Emily Guertin, Brock University
emily.guertin@brocku.ca, (289) 683-4044

In Partnership with

This description, a copy of which will be left with you for your records and reference, is only part of the process of informed consent. It should give you the basic idea of what the research is about and what participation will involve. If you would like more detail about something mentioned here, or information not included here, you should feel free to ask. Please take the time to read this carefully and to understand any accompanying information.

Purpose of Research:

For children with Developmental Disability who also have obsessive-compulsive behaviors (OCBs) that cause interference, we are interested in understanding more about what types of treatment techniques are helpful in reducing OCBs. We are interested in testing out a combination of behavioral and cognitive-behavioral assessment and treatment methods that have been effective in treating anxiety and behavioral issues in child populations. Each child in the study will be provided with an individualized treatment program that is modified to take into account his or her unique profile/characteristics, and involves at least one parent and teacher throughout the process. The purpose of this study is to evaluate whether a combined cognitive-behavioral and behavior analytic treatment package is useful in reducing OCBs to manageable levels in very young children, and, in turn, improving both the child and caregivers' quality of life. We are also interested in learning about the skills teachers learn while participating in the treatment of participating children.

Description of Research:

In the assessment and observation phase, members of the research team will come to the school in order to ask the parent and participating staff members about the OCBs of concern to them. The research staff will also collect information about how the behavior looks, how frequently it occurs, and the desired levels of the behavior when treatment ends. This will consist of two to three visits to the school to meet with a staff member and observe the child at school in the situations when OCBs occur. Any diagnostic assessments will be for research purposes only and will not constitute clinical diagnoses or reports.

In baseline, the parent, research staff, and teacher will collect information on the OCBs before the intervention. This phase will be several weeks, with approximately three to five observations of the research staff. The research staff will also observe how staff typically interact with the participating child during the OCBs.

In treatment, the research staff will work with the parent and teachers to train them on the intervention for OCBs. The research staff will also work with the participating child directly to model the treatment for the teacher. The training will include information about OCBs in children, individualized intervention planning, exposure and response prevention, reinforcement

in accordance with Montessori practices, and relapse prevention. Treatment will take approximately twelve weeks, with visits from the research staff one to three times per week to observe, conduct assessments, complete staff training, and work directly with the child.

A follow-up period will occur one to three months following the end of the treatment phase. The research staff, parent, and teacher will complete one week of data collection about the OCBs in treatment. This would consist of one to three visits from the research staff and the teacher would complete 5 brief daily questionnaires.

The majority of treatment and research components discussed above will be delivered by the primary student investigator (Emily Guertin), a second-year MA student in Applied Behavior Analysis at Brock University. She is trained and supervised on a weekly, ongoing basis by the primary investigator (Dr. Tricia Vause), who has a Ph.D. in Clinical Psychology and has the Board Certified Behavior Analyst – Doctoral level qualification.

In addition, an undergraduate-level assistant therapist will help with the administration of regular visits and data collection and analysis. Another graduate student research assistant will aid in the assessment process to evaluate the reliability of the assessment measures. This student is trained and supervised on the measures by the primary investigator.

Potential Harms:

Generally, the procedures used in this study present no risks to the participants beyond what they encounter in everyday activities. When certain procedures are introduced, it is possible that there may a short-term increase in worry or stress in the participating child. However, in the long term, it has been shown that exposure to these procedures has led to a reduction in symptoms of children.

Potential Benefits:

Participants will benefit directly in that we will determine what OCBs your child presents with and conduct an individualized assessment and intervention with the goal of symptom reduction.

Will I receive the results of the study?

If you wish to have a written description of the results, please check YES in the appropriate box at the end of this form and we will send you a summary of the purpose of the study, general findings, as well as relevant information concerning your child including techniques or strategies that worked well for your child within 3 months after the completion of the study.

Cost:

There is no payment or cost for participating in this study.

Confidentiality:

The results of the assessments and observations described above will remain confidential and stored in a locked office. Any presentations, reports, or publications about the project will not contain any identifying information regarding the participants or school. The information will be kept indefinitely, and will only be used for educational purposes.

Given that the study occurs in a school environment with multiple staff and students present on site, it is possible that other members of the school will be aware of your participation in the study.

Exceptions to this confidentiality include any situation where a child is observed to be at-risk for abuse or neglect; we have a legal duty to file a report under Section 13 of the Child,

Family, and Community Service Act. In any situation where a child is observed to put him or herself at risk, we will follow guidelines outlined by the College of Psychologists of Ontario.

Participation:

Participation is voluntary. If you choose not to participate, the services that you or your child currently receive will not be affected in any way. Moreover, even after you give consent, you can stop any time and for any reason by simply calling the principal investigator listed at the end of the consent form. Should you choose to withdraw consent, your data will be stripped of all identifiers and be retained for research purposes. If the principal investigator determines that you are a better match for another study offering a comparable behavioral assessment and treatment, you will be notified of this and be given the option to participate. If you would like to seek other alternatives beyond participation these research studies, please contact Dr. Vause for a referral to other services in your region.

Last, the cooperation of your child to continue in this study (e.g., their willingness to work with the research project staff) will be monitored throughout the study. If at any time your child does not want to participate, that decision will be respected and the session will be cancelled/rescheduled. If you feel that your child is unable to communicate this to us, we will rely on you or school staff to let us know if and when to stop the sessions. If this happens on a continual basis (e.g., several times in a row), we will accept this as a possible indication that your child does not wish to continue and will discontinue his or her participation from the project. Of course, we will discuss this with you before the decision is made.

Future Studies:

The results of this research may lead to other related studies in the future that may be beneficial to your child. Please check the appropriate box at the end of this form and provide your contact information in the provided area if you would like to be contacted directly by the researchers in the future about other studies.

Consent:

Signing the following page of this *Project Description and Consent Form* indicates that you have understood to your satisfaction the information regarding participation in the research project and agree to participate. In no way does this waive your legal rights nor release the researchers, sponsors, or involved institutions from their legal and professional responsibilities. You are free to withdraw from the study at any time, and/or refrain from answering any questions you prefer to omit, without prejudice or consequence. Your continued participation should be as informed as your initial consent, so you should feel free to ask for clarification or new information throughout your participation. This study has received ethics clearance through REB file # 16-010. The Research Ethics Officer can be contacted at mailto: reb@brocku.ca or (905) 688-5550 ext. 3035, and can provide responses to questions about the research participant's rights.

I, _____ hereby:
(Parent, please print name)

☐ consent to my participation and my child's participation in completing direct and indirect assessments.

☐ consent to _____'s participation in this study.
(please print child's name)

By giving consent I allow the research project staff to:

- Work with me and staff members me to complete direct and indirect assessments and questionnaires about my child's OCBs before and after the treatment.
- Work with my child in the school environment for three to six hours per week for approximately 12 weeks to develop and implement a treatment for the participating child.
- Train teaching staff and a parent to administer the intervention to my child.
- Administer questionnaires (including obsessive-compulsive behavior and verbal and nonverbal reasoning) assessments that involve me and my child before and after treatment (including a follow-up approximately 3 months after the last treatment session).
- Administer questionnaires and interviews to me and teachers at my child's school regarding obsessive-compulsive behaviors.
- To obtain personal information about my child, including: age, diagnosis, level of functioning, previous intellectual and adaptive behavior assessments, and previous psychological assessments.
- Share assessment and treatment information with my child's teacher, as it pertains to the ongoing treatment for my child.
- Include the results in publications, reports, and talks, so that others may learn from this project.

Please circle YES or NO for the following items:

YES NO I would like to receive the results of this study pertaining to repetitive behaviors.

YES NO The researchers may contact me directly for possible future related studies.

I understand that I can revoke or amend this consent at any time and for any reason.

_____	_____
Name of Parent	**Signature**
_____	_____
Name of Researcher/Delegate	**Signature**
_____	
Date	

If you wish to be contacted by the researchers in regard to possible participation in future research studies, please provide your contact information below.

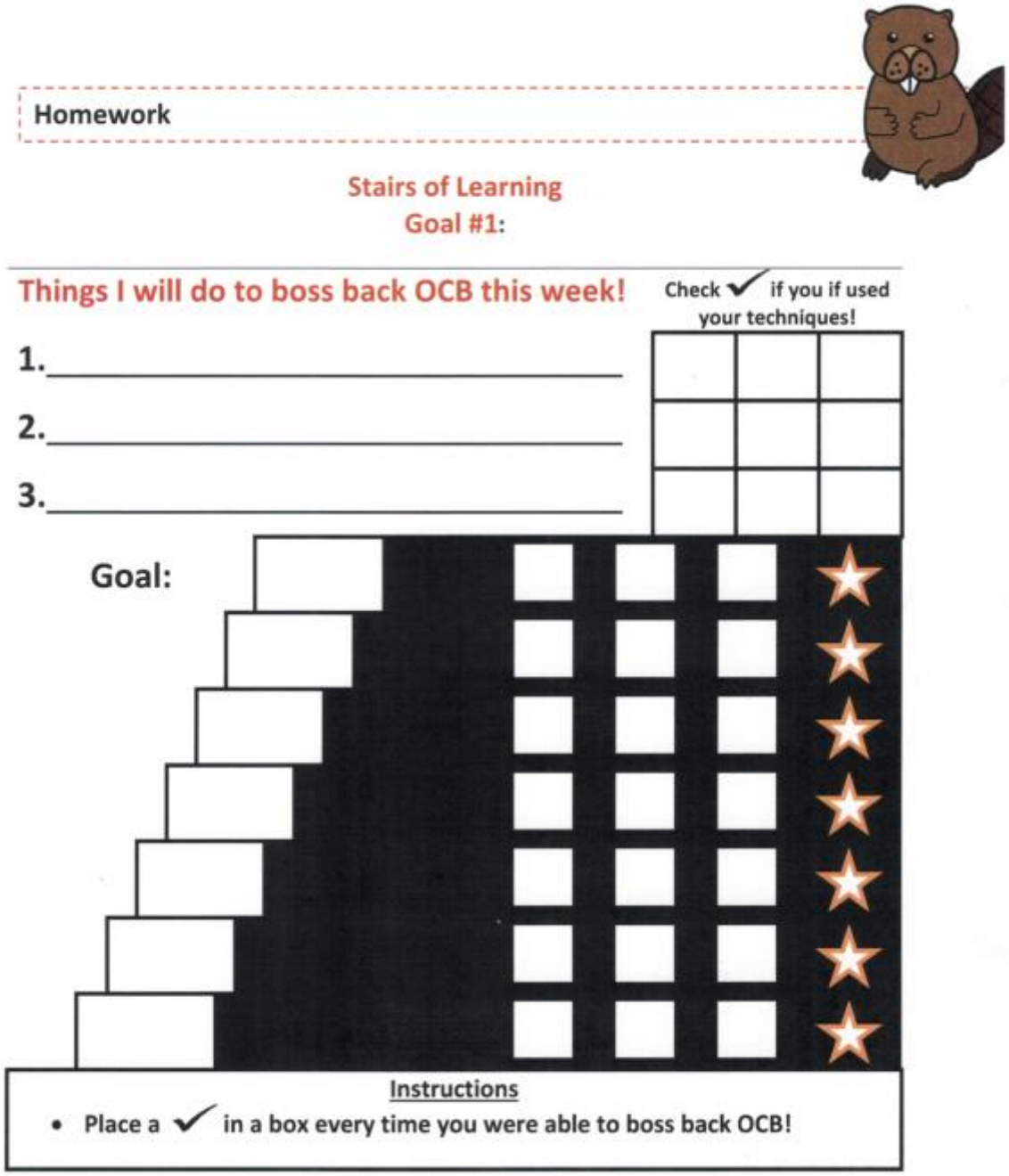
Name	**Telephone Number**	**Email Address**

The person who may be contacted about the research is:

Principal Investigator: Dr. Tricia Vause, Brock University
tvause@brocku.ca, (905) 688-5550 ext. 3559

Appendix I

Stairs of Learning



Appendix J

Therapist Treatment Integrity – Morning Routine

Observer:
Date Observed:
Therapist:

YES	NO	N/A	Step
			Greets the child and parent at the vehicle.
			Asks about how the child and parent are and for any updates on OCBs and overall wellbeing.
			Reviews the current treatment plan with the parent and child using the story guide.
			Reminds the child of coping strategies to try.
			Asks the child to select a coping strategy to use.
			Asks the child to perform the exposure or task.
			Prompts to engage in the coping strategy the child selected.
			Provides behavior-specific verbal praise.
			Reminds the parent to provide verbal praise.
			Provides a tangible reinforcer.
			Arranges for the peer to greet the child upon arrival in the classroom.

Appendix K

Therapist Treatment Integrity:

Work Routines and Refusal to Work with Peers

Observer:
Date Observed:
Therapist:

Yes	No	N/A	Step
			Speaks with teachers about the opportunities to work on the program that day.
			Reviews the current treatment plan with the child using the visual guide and Stairs of Learning.
			Reminds Max of the coping strategies to try.
			Asks Max to select a coping strategy.
			If necessary, prompts Max and the peer to follow the current step in the Stairs of Learning.
			If Max engages in the compulsion, asks the peer to remain at the activity and complete the current step of the exposure (or an approximation of the current step).
			Provides behavior specific verbal praise to Max for completing the exposure.
			Provides praise to the peer.
			Checks off the Stairs of Learning with Max.